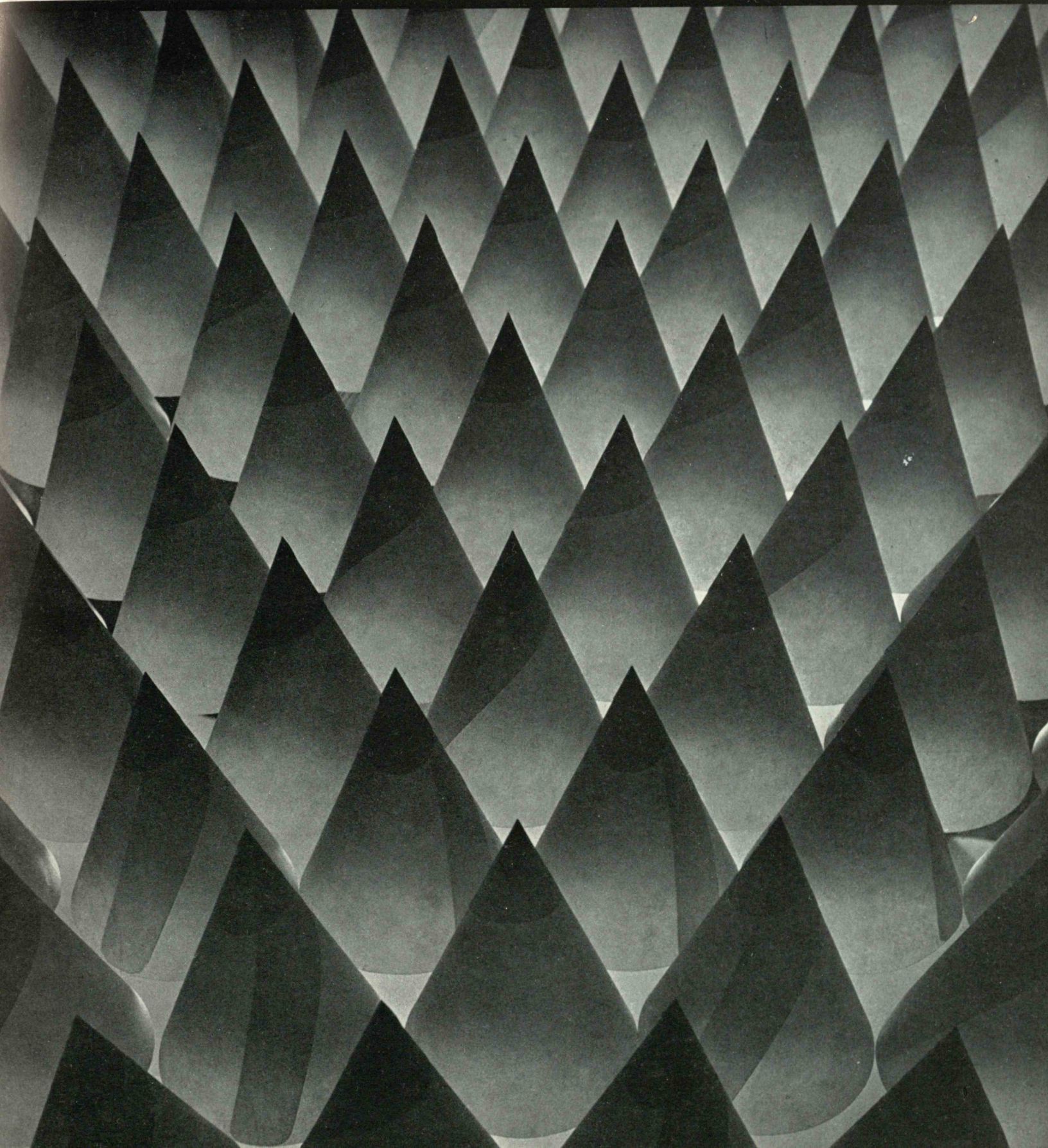


April 1939

TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office



technology review

Published by MIT

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THE TABULAR VIEW

IN a world filled with wars and rumors of wars, the subject of defense and the means thereof is one which few thoughtful men can ignore. As far as the United States are concerned, discussion of the implementation of warfare focuses now, as it must in the future, on insurance against aggression and on nothing else. Commander Henry E. Rossell's article on naval armament in the January Review (page 120) considered one aspect of this problem; another is reviewed currently (page 251) by FREDERIC E. GLANTZBERG, '27, who, as captain in the Army Air Corps, brings like expert judgment to bear on the importance of aviation in the general defense program of the country. Writing of course unofficially, Captain Glantzberg offers an analysis of the preludes to Munich, which takes on added interest in the light of recent developments in Central Europe. ¶ Associate professor of physical metallurgy at the Institute, JOHN WULFF is pleasantly known to readers of The Review as author of a pioneering presentation, in our December issue (page 74), of the important technique of powder metallurgy. Another activity with which he has been identified is the concerted study of the production of corrosion-resistant alloys which, in characteristic Technology fashion, is being made by a committee of coöperators drawn from several Institute Departments. Surveying in this issue (page 254) the background out of which the problem grows, Dr. Wulff canvasses alloys as a means of decreasing enormous annual losses due to corrosion and presents in conspectus salient findings of the research program continuing at the Institute. ¶ It is the task of such a section as the Trend of Affairs to report, to comment, to explain. These functions it should perform with respect to the interesting, the important, the unusual in its field as the news of the month discloses them. As reporter, the Trend of Affairs occasionally will offer the factual statement of some new thing which later deserves more critical treatment; thus it is with the development of frequency modulation as a new factor in the radio equation. Noted in March (page 200), this center of fascinating speculative possibilities is expertly explored in this issue (page 257) by DONALD G. FINK, '33, who writes with the authority to be expected of the managing editor of *Electronics* and with the gusto of one who has been and gone and seen and heard. His article, in addition to its value as exposition of a puzzling subject and as stimulating foreglimpse into a possible future, affords interesting commentary on the interrelationships of ingenuity and industry. ¶ The pronouncements of public men command a passing attention automatically because of the official positions of their authors. But they command a lasting respect and remain in memory when they result from the vigor of mind and integrity of spirit which are independent of private or public status. The Review directs your attention to a farseeing discussion of intellectual freedom by KARL T. COMPTON, President, which appears in the Institute Gazette (page 261).

No. 15

Just for Fun!

A CHALLENGE TO YOUR INGENUITY

THERE seems to be a widespread impression that the perspective of a circle, viewed obliquely, is always an ellipse. However, the true perspective of a circle so viewed may be a circle, ellipse, parabola, or hyperbola, with the straight line as a limit! Can you find the necessary conditions in each case?

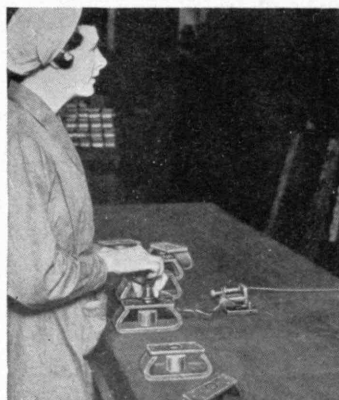
Calibron Notebook No. 3, "Perspective and Optical Illusions of Depth," is an accurate and concise reference text for students, designers, and photographers. It also contains much material of general interest, including several striking illusions. (44 pages, coated paper. Single copies 50 cents, postpaid in the U. S. A. Ask for details and quantity prices.)

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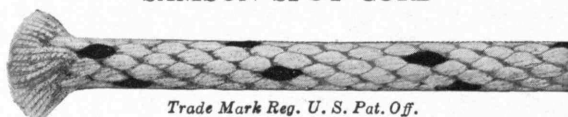
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MAIL RETURNS

Approximations and Taxonomy

FROM CHARLES H. BLAKE, '25:

The following may have some interest as technical footnotes to my paper on wood destroyers in the January Review.

Those who do not concern themselves with that branch of biology called taxonomy (the classification of organisms) berate the taxonomists for not knowing their own minds and, hence, not achieving a stable classification. Actually a stable, and *correct*, classification is the aim of taxonomists, but since any classification is better than none, we must, in view of the incompleteness of our knowledge, approach the goal by a series of approximations after the fashion of a pendulum coming to rest. In the first draft of my paper I spoke of false death-watch beetles (*Bostrychidae*) and powder-post beetles (*Lyctidae*). I had overlooked the fact that Böving and Craighead had divided the first family into two (*Bostrychidae* and *Psoidae*) on the basis of characters of the grubs. Recently a definitive catalogue of this group of beetles by P. Lesne has come to hand, and we find that all three families are thrown together as one (*Bostrychidae*)!

The mention of Hopkins' equivalent isophane (line of simultaneous appearance) referred to his work on bioclimatics (United States Department of Agriculture, Miscellaneous Publication No. 280). In effect, an isophane enables us to define the temperature characteristics of a point on the land by a single figure. Perhaps this may prove to be an oversimplification, but at least it is an attempt to define numerically the ranges of organisms and of certain biological phenomena in usable terms. It is one of the simpler applications of mathematics to biology. At the other extreme stands Woodger's "Axiomatic Method in Biology," in which the essentially nonnumerical apparatus of symbolic logic is brought to bear on biology. So far as I am concerned this latter method has no practical value, since I am not convinced that it leads to increased clarity of either thought or expression.

Lincoln, Mass.

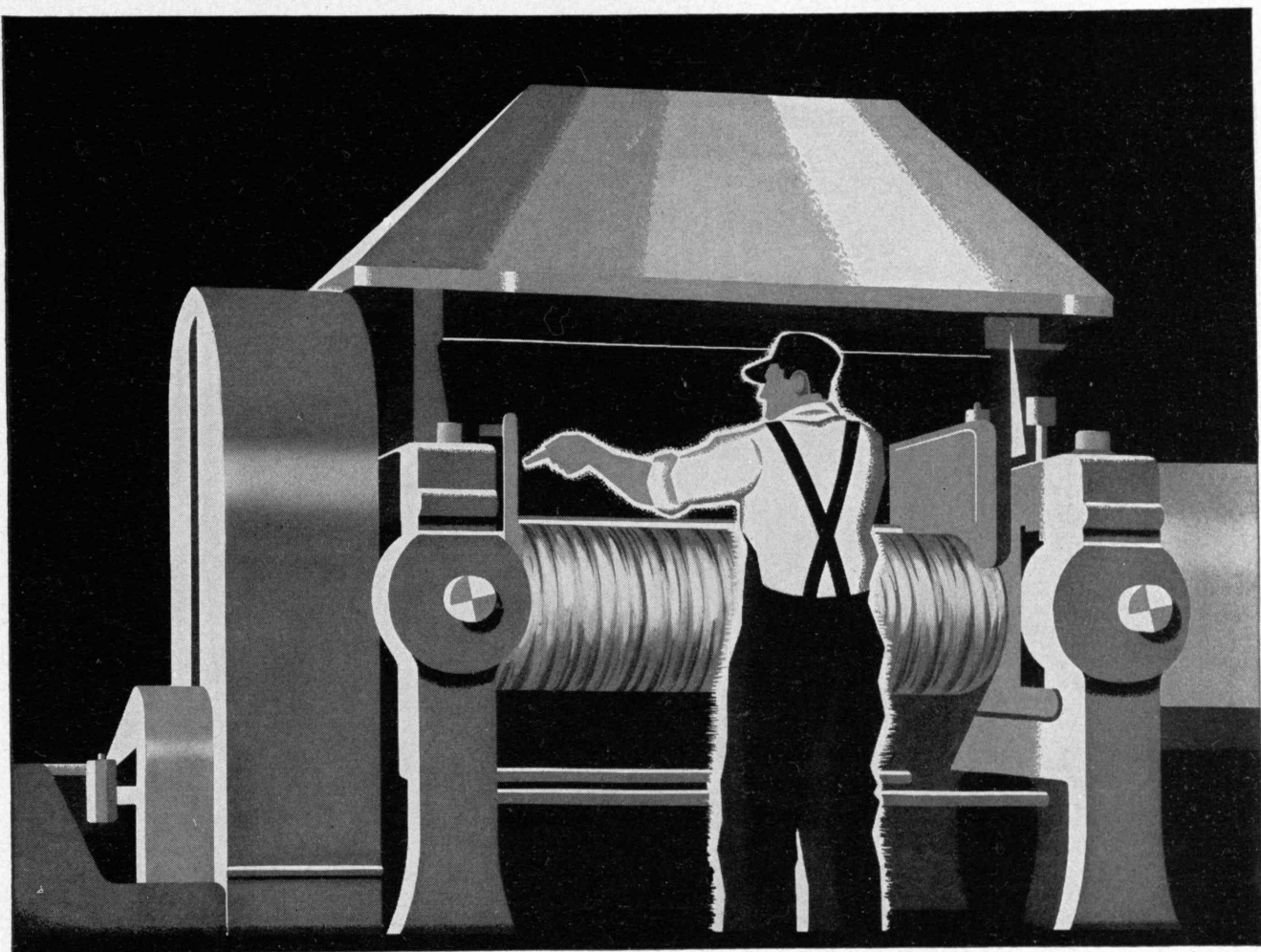
Domiciliar Conversation

FROM EVE WITHERS:

Sulphurous comment about planned economy, as respondents to your questionnaire about housing present it (see The Review for March), seems to put most of its emphasis upon the assumed hatred of being coördinated. Thus planned communities are attacked as lacking "individual opportunities for the home lover," being "too regimented," and being populated by people who "are too much like my own social set." All of these statements seem to me to contain much truth, and no doubt they serve as full reason, in the minds of their writers, for the choice of domestic environment which the writers have made. Thus both as outward argument and as inward rationalization for a given decision, they are effective.

Really, what these writers are talking about is the great difficulty, if not the downright impossibility, of escaping from the house itself anyway. From my own experience I am convinced that the younger home-owning class — that is, the group who have accumulated enough of the world's goods, or enough credit, or enough speculative ability in combination with energy, to buy and own, or to build — very easily become so engrossed with the house, or so fatigued by the outlay of work necessary to buy it, that they can talk about little else. It is always a case of comparing cellars, and arguing about kinds of insulation, and agreeing secretly, after the guests have gone home, that one's own decision about roofing materials was the right one and Simpkins after all didn't know what he was talking about. Here is the difficulty with the planned community: It enhances the sameness of people because it imposes on them the task not merely of justifying in conversation the purchase of a house which was more or less free choice but the purchase of a house which, because it is the product of a deliberate effort at efficient perfection, can't escape being a standardized thing — neat, clean, smooth, slick, and hence unoriginal, unindividual. The only way in which to justify the wisdom of buying House A rather than House B then becomes a pseudoscientific totting up of material attributes, and conversation degenerates into statistics of heat loss, and the highballs wilt as the long evening wanes.

Winston-Salem, N. C.



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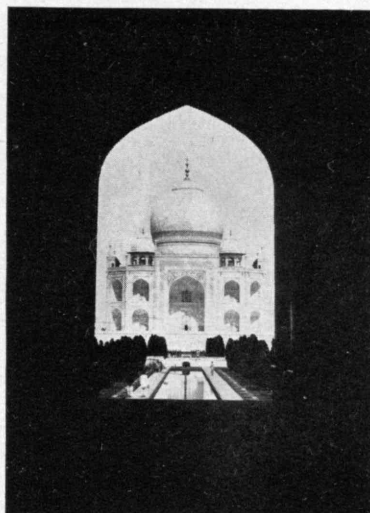
low angle "pantograph" arrangement that causes the tire to *compress*—instead of stretching—when inflated. As air goes in the tread *compacts*—literally "makes a muscle"—becoming so much more resistant to cutting and wear that it delivers 33% longer mileage! You get this matchless wear in a nimbler, more flexible, easier-riding tire. The "G-100" is Goodyear's newest triumph in tire engineering, built inside and out nobly to *deserve* "the greatest name in rubber."



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GOODYEAR



Crispness of contrast in an Indian version of the Taj Mahal

K. Lall

THE TECHNOLOGY REVIEW

Title Reg. U. S. Pat. Office

EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

VOL. 41, NO. 6

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"CONES" — PAPER DRINKING CUPS

From a photograph by Kirby Kean

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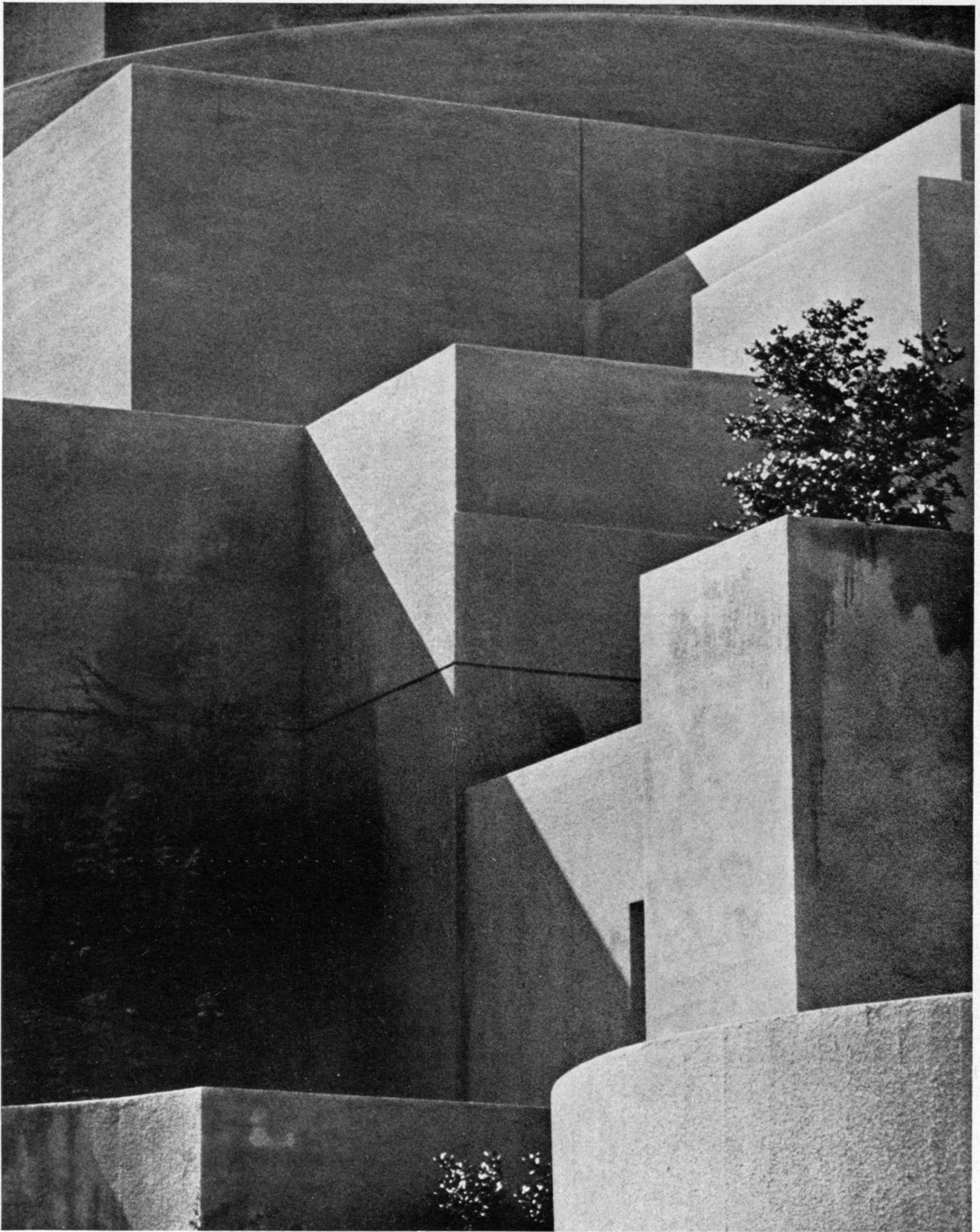
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Raymond B. Collard, '20

LINES, CURVES, AND ANGLES

The base of the Coit Memorial Tower on Telegraph Hill, San Francisco

THE TECHNOLOGY REVIEW

Vol. 41, No. 6



April, 1939

The Trend of Affairs

Subatomic Dynamite

PHYSICISTS have been poking at atomic nuclei for some time now, trying to find a trigger which would unleash the energy bottled up inside. Recently they found triggers for two of them — uranium and thorium. A uranium nucleus, when nudged by slow neutrons of energy less than a volt, sometimes blows up, shooting out fragments with energies of more than a hundred million volts. The exploding nucleus seems to break into two pieces of approximately equal mass, plus a spray of extra neutrons. Similar results have been observed with thorium, though the trigger here seems to be stiffer — neutrons of about a million volts' energy being needed to set off the explosion. Gold, silver, bismuth, lead, and several other heavy elements were also tried, with no results.

This does not mean that a way has been found for drawing energy from nuclei in unlimited amounts. The efficiency of the new process is as yet too low to make it possible to get more energy out than is put in to generate the neutrons. Nevertheless the new experiments show an energy output considerably greater than those previously known, and they indicate that nuclei can divide into halves. In all reactions hitherto discovered the nucleus loses only a small piece of itself in the explosion, acting more like a gun than a bomb. One can speculate at length on the possibilities suggested by the new discovery, but such speculations are premature as yet. The present results, however, show two interesting aspects.

The first aspect of interest is that the results seem to confirm the Bohr "waterdrop" theory of the nucleus. Professor Bohr has been insisting for several years that in their behavior atomic nuclei are very analogous to drops of water. This seems a bit farfetched at first, for nuclei are hardly dewdrops, being unbelievably small and being held together by forces which are neither

electrical nor gravitational in origin. Nevertheless, Professor Bohr's opinions carry weight, for he is a Nobel Prize winner and one of the founders of the modern quantum theory.

He pictures the constituent protons and neutrons in a nucleus being held together by a sort of surface tension analogous to the surface tension which keeps a raindrop spherical. Ordinarily, in most nuclei, the surface tension is large enough so that none of the constituent particles can "evaporate." When an extra particle, a proton or neutron, is shot into a nucleus, however, the impact temporarily lowers the surface tension and "heats up" the nucleus, making it possible for one or more particles to evaporate away. This is the case with the artificially radioactive elements which are produced today in large variety and quantity in high-voltage laboratories all over the world. In these reactions, however, only a small portion of the nucleus is splashed out during the collision and the energy obtained is small compared to the output from the new experiments.

The natural radioactive elements are explained by saying that the nuclei of such elements are too large for the surface tension to hold the particles in. A few of the particles must evaporate from the surface before the nucleus becomes stable. In these cases, also, only a small part of the nucleus comes loose, and a relatively small amount of energy is released.

The waterdrop theory is obviously just an analogy which may be useful in suggesting further experiments. The new experiments show, however, that the analogy is closer than had been expected: They show that some heavy nuclei are unstable in the same manner that large waterdrops are unstable. A slight touch will start a large drop oscillating — elongating and flattening periodically — until the elongation is too much for the surface tension and the drop breaks in two. The analogy between this and the recent nuclear results is quite striking.



Ewing Galloway

The soleplate of a slow-speed synchronous electrical machine is being stitched in place by this welder

ing. There are differences, of course: For the drop of water the division is made without much fuss, but for the nuclear droplet the change involves a tremendous release of energy. Let us hope that a systematic exploration of the waterdrop analogy will suggest other fruitful experiments.

The other interesting aspect of the new discovery is the rapidity of check and countercheck of experiments in present-day physics. The discovery was made by Hahn and Strassman in Berlin in December. It was quickly checked and studied further by Meitner and Frisch, German refugees working in Stockholm and in Bohr's laboratory in Copenhagen. Bohr brought the news to this country, discussing the implications of the results at a conference in Washington on January 26. The February 15 issue of the *Physical Review*, journal of the American Physical Society, has announcements of confirmation and further details from four laboratories in this country: the Bureau of Terrestrial Magnetism, Carnegie Institution at Washington; Johns Hopkins; Columbia University; and the University of California. Anyone who has seen the mass of equipment used in a neutron generator and the tangle of sensitive electrical and photographic gadgetry needed to investigate nuclear reactions will be impressed at the speed of the laboratories in adapting equipment to the new experiment.

Government and Research

SO often cited as to make repetition egregious, the interdependence of science and democratic government is a social phenomenon unusually well publicized. Fresh reference to it is here made merely to suggest the fundamental justification for the recently issued set of monographs discussing the relation of the Federal government to research — the first volume of a series on the general subject of "Research — A National Resource," which is being carried on by the National Resources Committee under the chairmanship of Harold L. Ickes, Secretary of the Interior. This first volume, the work of the science committee, includes discussions of research carried on by the Federal government in the natural sciences and technology and in the social sciences, Federal expenditures for research, legislative provisions affecting research by Federal agencies, the legislative branch and research, the relation between problems of the Bureau of the Census and the social sciences, the relation of the Library of Congress to research, and research in American universities and colleges.

This last subject, the committee well argues, is a matter of direct concern to the Federal government for several reasons, conspicuous among which are the functions of universities as centers in which undergraduates are recruited to research, as the chief centers of initial training in research, as sources of personnel for temporary appointment in government service, and as centers of advanced training for government workers, in

addition to their importance as centers of pure research and forcing beds in which research problems originate. Although in one section the report speaks rather crisply of the fact that the government "is now spending more on research than any other one agency, and more than all the universities combined," it also presents estimates of research disbursements which significantly suggest the importance of the work done by colleges and universities. For example, expenditures of \$50,000,000 by the universities represent the allocation to research of as much as 25 per cent to 32.5 per cent of the total expenditures by some institutions. Government normal expenditure for research is set at about \$70,000,000 — or two per cent of the regular current expenses of the Federal government — which in 1936-1937 was increased by some \$50,000,000 more from emergency funds. Industry meanwhile expends on research about \$100,000,000 a year — some corporations allocating to this purpose as much as four per cent of their gross income.

The employment of this total of \$220,000,000 — from which the government's emergency expenditures of \$50,000,000 are omitted — engages about 50,000 research workers, according to the committee's report. This census is at best approximate but is arrived at by two different methods. Since the problem of securing able research workers for governmental activity is highly

important and since the question of the training of workers is cognate with it, the committee has analyzed this aspect of the research situation with considerable sharpness. Relying upon the lists of "American Men of Science" as a standard for judgment of distinction in research in the natural sciences, and correlating the location of starred men with the conferring of advanced degrees, the committee finds that most men are trained in methods of research in those institutions where the ablest research workers are located. Thus on a percentage basis, 11 institutions conferred 50 per cent of doctorates in the years 1934-1937 and employed 49 per cent of the 1,556 outstanding scientists starred in "American Men of Science"; 14 institutions conferred 25 per cent of the degrees and employed 27 per cent of the starred men; 18 institutions conferred 15 per cent of degrees and employed 10 per cent of starred men; 44 institutions conferred the remaining 10 per cent of degrees and employed 5.5 per cent of the starred men, the rest of whom are employed in institutions not entering the calculation.

The function of the universities in contributing to the research forces of government becomes obvious when one observes that of the total number of starred men — 1,556 — universities and colleges employ 76 per cent. The ablest scientific minds are thus seen to be concentrated in the academic world and to be concentrated within that world in those institutions furnishing the country with the greatest share of its supply of potentially able researchers. Greater coöperation between government and universities, which the committee discusses, may assist in recruiting governmental research personnel and in cutting down the competition for research workers which the committee reports.

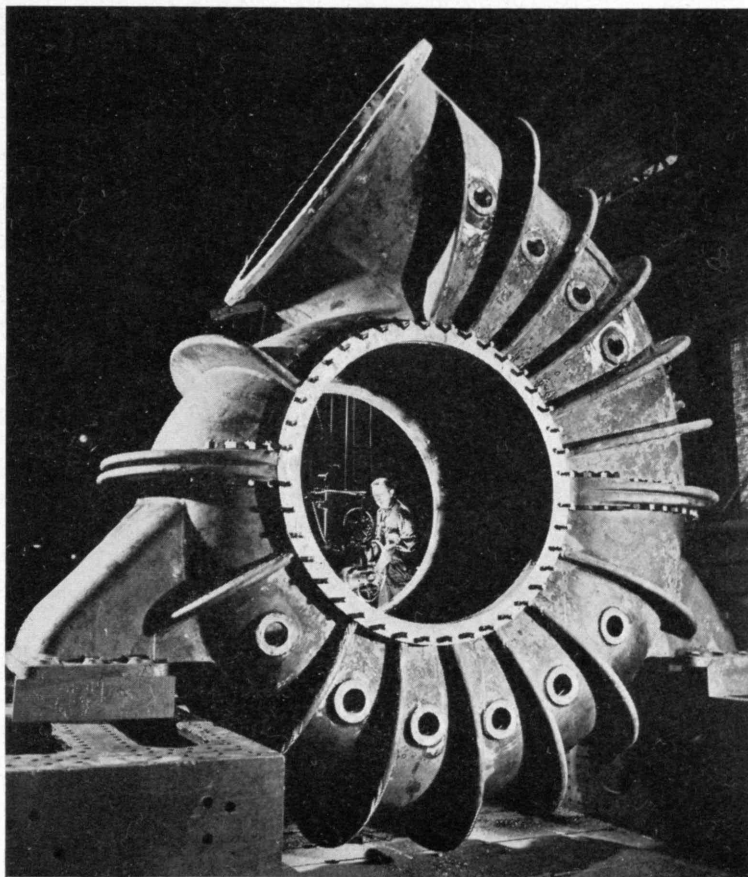
To the Institute itself the report is of immediate interest. Six institutions, for instance, are listed as spending more than two millions a year on research; four as spending from one and a half to two millions; and four — Technology, New York University, Ohio State University, and the University of Pennsylvania — as spending from one to one and a half million. Harvard leads the list of institutions in the percentage of starred men included in its roster, with 113 — or 7.2 per cent — of the star list for 1938; Technology has 29 — or 1.85 per cent — and stands 15th in this category.

The Barrage at Sukkur

WITH an irrigated area totaling some fifty million acres — more than twice the irrigated acreage of her nearest competitor, the United States — India affords the most emphatic illustration of the extent to which man has been able to alter natural disposition of waters in order to assist agriculture. Of the many powerful works which have been erected for this purpose, the barrage at Sukkur on the Indus River — officially known as the Lloyd Barrage and Canals Construction

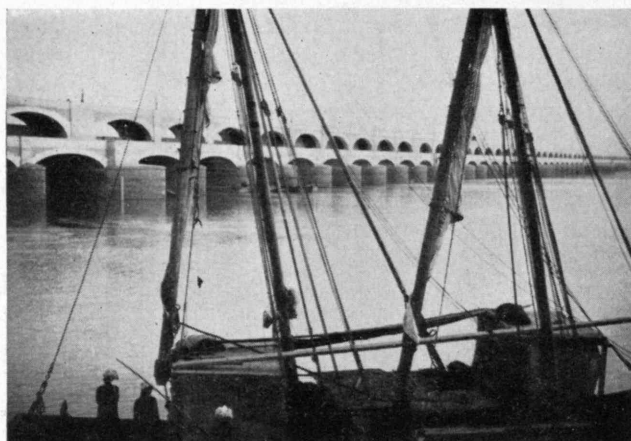
Scheme — is the most spectacular recent development. Commanding a gross area of seven and a half million acres, of which six and a quarter million are cultivable, the entire scheme when completed represents an expenditure of some \$72,000,000 — an earthwork of about 279,000,000 cubic yards to supply dependable flow through a network of canals and field channels amounting to some 52,600 miles.

The barrage itself, as the photographs on the next page suggest, resembles a two-level bridge rather than a dam. Between the piers supporting the platforms are swung 50-ton steel gates, electrically operated, to check the flow of the Indus, raising the water level on the upstream side and thus supplying the six enormous trunk canals, three on each bank, which run on down into Sind and the Khairpur State. The barrage and head regulators consist of a low masonry dam of 66 spans of 60 feet each, making a total length of about a mile. The floodgates of the new system were opened in 1932; prior to that time some of the canals had already been in operation, and construction of further works has continued since then. This harnessing of the mighty Indus, in which as many as sixty thousand men have been employed at one time, is expected to bring into use a section of northwest India a quarter the area of England, or a half million acres larger than the entire cultivated area of Egypt. The new channels flow through a desert area in which rich soil from 40 to 90 feet in depth is covered by a thin layer of sand which in some places is blown up



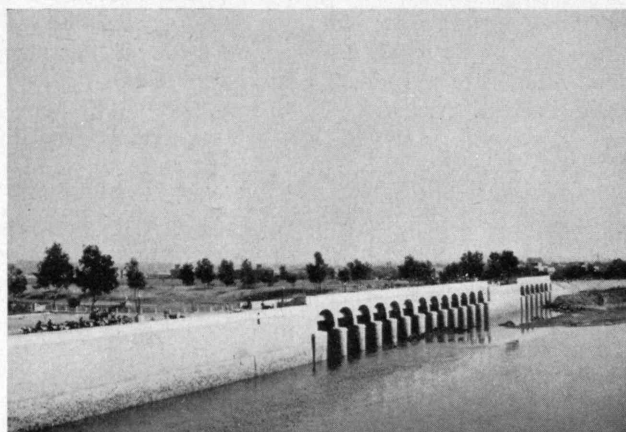
Allis-Chalmers

This Gargantuan metal snail shell is the suction elbow of a cast centrifugal pump casing, weighing 45,000 pounds



William F. Rivers, '26

The arches of the Sukkur Barrage, as seen through the rigging of a native-manned vessel, sweep across the Indus River in the picture above. At the right are shown two of the headworks, or regulators, on the right bank of the river, governing the flow of water to the canals which are turning deserts into productive farming lands. Taken in December, these pictures show the Indus at low pitch, with the barrage gates raised



into hills. Gradual leveling of these hills through wind action will improve the productivity of the intervening land by increasing its lightness. Sind is the province of India nearest Europe, possesses a temperate climate in addition to its rich soil, and is served by the speedily growing airport city of Karachi — among the most progressive in all India.

Ships and Records

SCOTTISH River Clyde, which often has been able to boast the launching of more ships in a year than the aggregate of any single country abroad, lost that distinction for 1938 because of the rapid rise in German and Japanese shipbuilding, according to an annual review of shipyard work in the *Glasgow Herald's Trade Review 1938*.

However, the Clyde is still far ahead of all other rivers or regions of the whole world in its output of ships, with launchings of 117 vessels of more than 100 tons, including the 85,000-ton *Queen Elizabeth*, which has been hailed as the greatest thing afloat. Clyde's output, which was more than three times as great as that of the nearest competing regions of shipbuilding activity, helped greatly, as usual, to swell the total British output and give that empire claim to about a quarter of all the shipbuilding in the world.

Although 1938 saw greater activity in the shipyards than had been seen since 1930, the increase over 1937 was small, and the predictions are that a decided decrease in activity can be expected for the coming year

in view of the fact that 1938 was a year of completion work on orders placed in 1937 and only a small tonnage has been started for subsequent completion.

The prestige of the British as shipbuilders and shipowners is greater even than indicated by the figures, because the output for 1938 in Germany, the Netherlands, and several other countries included a large number of contracts placed by British shipowners. Many of the Dutch yards were employed exclusively in construction of the British coastal fleets. For this past year the United States took fourth place among the world's leading shipbuilders, following after Great Britain, Germany, and Japan. The Bethlehem Shipbuilding Corporation, Ltd., and the Sun Shipbuilding and Dry

Dock Company were the leading American producers. The General Electric Company occupied sixth place in the building of marine engines, following three British companies, one Danish, and one Italian.

Rome's Fair, Ostia's Revival

THOUGH, as is fitting for an ancient empress, Rome's exact age is in doubt, the city will be considered 2,695 years old

on April 21, 1942. The Italian government has assigned this as the day for opening the gates to Italy's "Universal Exhibition," to show as its main attraction a newly built Roman city; 12 miles to the southwest will be one of the fair's side shows — Ostia, skeleton of an imperial seaport, and more lately the mute memorial of what was likewise once a Roman city.

Already at work on the Tre Fontane just outside of Rome on the left bank of the Tiber, steam shovels, graders, and 1,500 men are preparing the 1,000-acre site on which it is planned to erect the exhibition buildings. The aim of the builders — in their own sonorous phrase — is to create a city which will be a " . . . monument and attestation of faith . . . in the classic principles of the ancient Romans," an "Olympiad of Civilization." The architects have drawn up a plan idealizing the characteristic outline of the Roman metropolis, possessing wide streets, houses, schools, shops, offices, and parks capable of becoming a permanent part of Rome's suburbs after the fair is over.

Farther down the left bank of the Tiber at what was formerly its mouth (*ostium*) is another and smaller group of men who for almost 30 years have been exploring the remains of the Roman Empire's greatest harbor and, to a lesser extent, the auxiliary ports constructed by Claudius and Trajan. At the moment, approximately one-fifth of Ostia is uncovered. By 1942 an additional 50 acres should be exposed. In space, these excavations are only a 20-minute automobile ride from the projected Universal Exhibition; in time, they are over 2,000 years removed.

Today all that can be seen of the port of Ostia are 40 desolate streets lined with ruined buildings set in a sandy plain two and one-half miles from salt water; yet from its docks once sailed the navies that defeated Carthage and to them came the corn (cereals, not maize) ships of the world to feed a city that grew and grew as Roman farms reverted to pasturage.

Ostia was probably Rome's first colony, certainly her first naval and commercial port of consequence. At first merely a trading post, the city took on world importance during the 119 years of intermittent war between Rome and Carthage. As Rome, 15 miles or so upstream on the treacherous and shallow Tiber, became dependent on imported food, Ostia became a vital factor in her economy. From 267 B.C. onward, or even before the first Punic War, a special quaestor (state treasurer) was in charge of the corn trade, and control over Rome's food supply became a political weapon that saw service during both the Republic and the Empire.

Rome's expanding population (it reached about 1,300,000 under Augustus) soon made the port inadequate for the demands of a world trade. Added to the hazard of the south-west wind, which every now and then invaded the harbor to sink whole fleets, as happened to more than 200 ships in A.D. 62, was the silt deposited in liberal amounts by the then, as now, tawny Tiber. These dangers and the normal demands of a busy harbor were sufficient to support a large guild of divers, as can be gathered from some of the 4,000 inscriptions found in the ruins.

Since Roman times, the shore at the Tiber's mouth has advanced more than two miles, and the river has changed its course so that a large part of the ghost port is now not even on a river bank. For a river only 253 miles long, the Tiber has done very well for itself, historically and geologically. That the Tiber has two outlets is an historical, not a geological, fact, by the way. During the reign of Augustus, it was recognized that a new harbor was needed, but no action resulted until Claudius (in the manner that Mayor LaGuardia digs a subway) built two moles inclosing an area of 170 acres. This new harbor, two and one-half miles north of Ostia, was named Portus Augusti and soon carried most of Rome's harbor traffic, but Ostia continued important. Then as Portus also began to silt up and as trade continued to increase, Trajan, by enlarging a channel originally constructed by Claudius, built a third harbor, which was connected both with the sea and with the Tiber. Thus was created a new mouth for the Tiber and a new island for Rome.

Until Trajan built Civitavecchia — a harbor still in use — Ostia was the best port along the central Italian coast. In its heyday during the second and third



Salvaged ruin and synthesized perfection to beguile fair-goers: Square of the Corporations in the ancient city of Ostia, which was the port to the Rome of the Caesars and which is some 12 miles distant from the site of the Rome World Exposition scheduled for 1942. At the left, answers to the problems posed by exposition architecture and design, as they are conceived in modern Italy, are presented by this portion of a scale model of the exposition, looking west

centuries, when its cosmopolitan population reached almost 100,000, it possessed extensive warehouses, a theater, baths, a firehouse, a sewerage system, and other appurtenances of a major Roman city.

As Rome decayed, however, so did Ostia. Alaric destroyed the last illusion of Roman invincibility by sacking the queen city itself in 410; after that the home of the Caesars had little need for a harbor, little need in fact for anything except heaven's mercy, for it seemed as if every enterprising bandit in Christendom or out of it was attracted by the fat pickings that lay around the Palatine. For the plunderers who came by sea, Ostia was a natural port of entry, and although the silting up of the Trajan channel brought a mild revival for a period, repeated sackings finally extinguished the city.

During this gradual destruction, the city was a loadstone for searchers after treasure and marbles, some of the latter being taken as far afield as Sardinia. The sands covered what was left, however, and maintained the ruins in a state of preservation that is excelled in Italy only at Pompeii. Sporadic attempts to uncover the port were made between the close of the 18th Century and the beginning of the 20th. In 1907 the Italian government resumed the program of excavations which has continued steadily. Greatly increased man power should permit about two-thirds of the ruins to be visible by 1942, with some buildings restored.

Even as these battered walls stand today, they form a link with the ancients which is almost breathlessly tangible. The multistoried tenements, with their

façades, inside courts, and window arrangements much resembling modern Italian apartments, the department store with its display windows, the marble-topped bar near the theater, the 70 agencies of ship companies are evidence of a way of life not greatly different from our own, of people who were far more than shadowy historical characters.

Since the Italian Universal Exhibition is to be of the uplift rather than the Billy Rose type, Ostia's ruins will form an appropriate exhibit, for the theme of the fair is the spirit which actuated the organization of civil society in ancient Rome, and the continuity that exists between that spirit and the modern social structure.

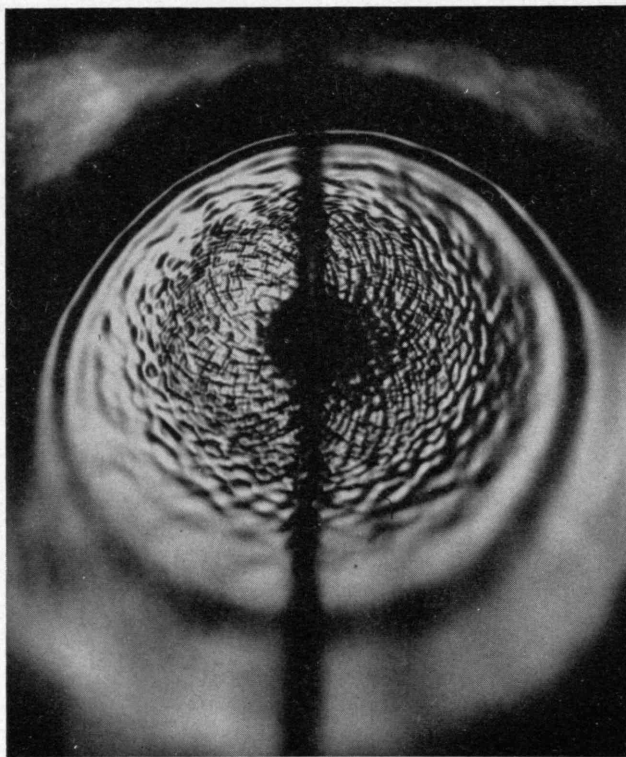
Yet while neither the exhibition buildings nor Ostia will show the true Roman city — one being a synthesized perfection and

the other a salvaged ruin — a sharp eye and a disciplined imagination will enable the visitor to deduce, according to his temperament, that: (1) The Romans were mighty builders of institutions, physical and legal, and their outlook on life was piercingly close to our own; or (2) all is vanity.

Profession of Engineering Concern

ENGINEERS and scientists join in deploring the increasing gap between the complexity of social organization and the breadth of social understanding. This hiatus furnishes material for one of the leitmotifs of the day; and the theme is played with many variations, from the paeon raised to a hypothetical world in which engineers and scientists would form the *aristos* to the double-bass clichés of those head shakers and beard mumblers who would arrest all technological progress until social comprehension has had a chance to catch up.

Thus it is no longer news when a distinguished savant optimistically inflates the balloon of human progress or when an important economist, sociologist, or politician lets the pressure off. But when a whole engineering society pauses to take stock of that gap in relation to its own membership, when it invites to its counsels representatives of other professions, that may be news. Pause and invite is exactly what the committee on publications of the American Society of Civil Engineers has recently done. The result is a symposium which is significant as an event regardless of its findings; these have been published in *Civil Engineering* for March.



R. P. Johnson, '36

MOBILE IMMOBILITY

This stationary pattern is formed by flowing water as the jet from a faucet spreads out over a horizontal surface of ground glass. On any slightly roughened surface such a pattern is formed — if you want to see it, ordinary bond paper will do the trick

asked with some force what price a sound and healthy body in an unsound and unhealthy state. Thus, if he is judged on the basis of accomplishment since the beginning of history, there is no reason for the engineer to be on the defensive.

The American Society of Civil Engineers is but five years younger than the American Medical Association, five years older than the American Institute of Architects, and substantially older than the American Bar Association. In its recent stocktaking it has, however, turned to the experience of these bodies. And it has done so with some reason, for it is possible to agree with the engineers that their society has functioned almost exclusively as a technical society and has done little about that other part of its charter which provides that one of the objects is "the professional improvement of its members."

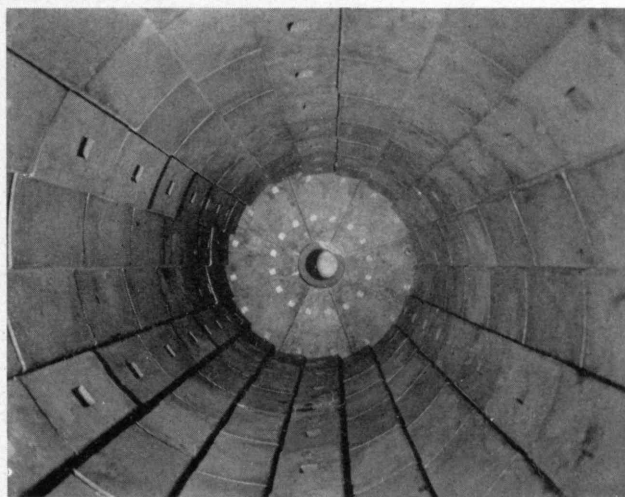
It may as well be admitted frankly that pursuit of such an objective entails among other things a judicious use of propaganda. Often the services of literature itself may be properly placed at the disposal of the propagandist. Such a play as "Yellow Jack" or such a biography as Vallery-Radot's "Life of Pasteur" may do much to make a public pleasantly conscious of the profession of medicine. There is particular interest, therefore, in the recent appearance of two books which may partly serve the purposes of the Society of Civil Engineers.

One of the simplest and most direct appeals can be made by the popular explanation of the works of a professional man. Even granting that a little knowledge is a dangerous thing, it must be recognized that the general

Engineers who have worried from time to time about the patent fact that members of their profession enjoy, on the whole, less social esteem than do their fellows at the bar, in medicine, or in architecture find in their history ample reason why this situation should not exist. The record indicates that "engineering and civilization progress hand in hand, even though haltingly." There was no reason for the architect to exist until society had been brought to a relatively high plane, and a large amount of the coöperative labor required to bring about this social integration was supplied by the engineer. Old as is the profession of the lawyer, it is calculated only to compose the differences between men, whilst the profession of the engineer is based on the higher premise of coöperation. Of the doctor it might be



Acme



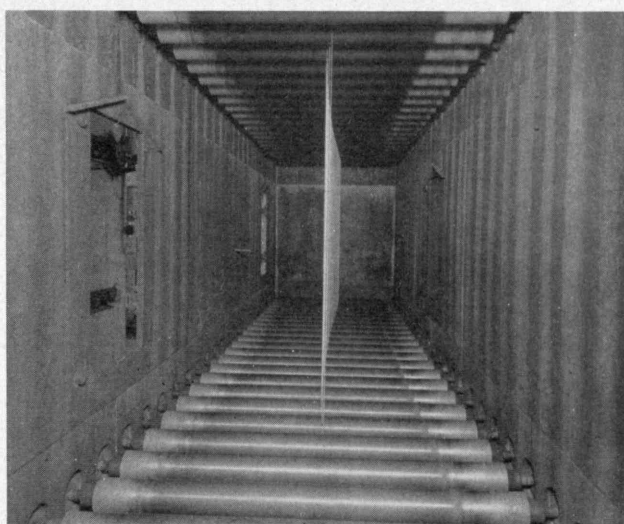
Mechanite Research Institute

public will make small effort to understand the basic philosophy or faith of the engineer. To such a public, works and not faith are important. An admirable example of clear and simple exposition of the acts of the engineers is afforded by the new edition of "What Engineers Do,"¹ by Walter D. Binger, '16. This sketches rapidly the various historical backgrounds and then sets out to explain with many and pleasant line drawings how a modern engineer proceeds to provide maps, bridges, buildings, railroads, flood control, or sanitation; in the course of this it also considers specific engineering materials such as steel and concrete and how they affect construction.

Other readers who wish a more philosophical interpretation of engineering achievements since the beginning of time will find profit and pleasure in "Engineering's Part in the Development of Civilization,"² by Dugald C. Jackson, formerly Head of the Department of Electrical Engineering. Dr. Jackson's style and philosophy are familiar to many a former student at the Institute, and both are preserved undiminished in this latest little book containing six lectures delivered last year at the University of North Carolina's College of Agriculture and Engineering. Rapid sketches of the growth of civilization concomitantly with the growth of engineering achievement form a running background for an encouragingly optimistic philosophy about the future of civilization.

¹ New York: W. W. Norton and Company, Inc., second edition, 1938. 259 pages, \$2.75.

² New York: American Society of Mechanical Engineers, 1939. 114 pages.



Republic Steel Corporation

Vista and vanishing point as offered by the steel framework for a Colorado River Aqueduct siphon (upper left); the interior of a ball mill, where ores are crushed (upper right); and that of an acid ager which removes acid from printed fabrics

Both of these books can well assist the endeavor of the civil engineers to better their professional status. Nor in seeking thus to promote what might seem a selfish advantage can this society be severely criticized. Regardless of the state of grace in which any of the other three professional societies may now exist, the observer must acknowledge that substantial portions of their careers have been concerned directly with promotion of professional status. As in all callings whose purpose is the service of the public, of course, the sort of activity which might be dismissed by the hasty as selfish in motivation has direct altruistic results. If the Bar Association, for instance, improves the position of the lawyer in the community by increasing his economic security and elevating his professional standards, the community as a whole will gain. Mandeville's paradox thus finds substantiation in the American 19th Century. From private improvement to activity of entirely public value has been a short step, so that we find the A.I.A. manifesting a substantial interest in the processes of architectural education, in the state registration of architects, in the improvement of building codes, and most recently in the housing problem. With less success it has sought to promote research in building materials and methods.

The American Bar Association has sought regularly to impose stricter standards on those who would be admitted to the bar, and to cleanse the profession of the morally unfit — activities which have immediate effect on the earning power and the prestige of the able and the honest. More public service has been performed by the A.M.A., which — despite the lightning bolts

presently flashing round its head — has, it must be remembered, not only improved medical education but has also done yeoman service in the suppression of nostrums, in achieving safety of drugs, purity of foods, and calibration of instruments which employ electricity.

When civil engineers look at these activities and compare their own social position with that of the architect, the doctor, or the lawyer, they can scarcely be chided if they lay upon their own lack of activity some of the blame for the ostensible dominance of the others. Various answers to the question implied in the situation are offered; one thesis widely held is that the difference in the educational training of doctor, lawyer, architect from that of the engineer explains the difference in social status which disturbs the Society of Civil Engineers.

Many men insist that engineering education must pay more attention to the humanities and the social sciences if engineers are to assume their proper position in the present social structure. With this idea *The Review* has no wish to quarrel, as will shortly appear. But in the interest of setting the record straight it may be remarked that the current education of architects, doctors, and lawyers does not on the whole tend to arouse in them such a strenuous social consciousness as seems to be imagined by the civil engineer.

The doctor, it is true, is in the great institutions forced through an arts environment before he begins his work in the medical college. But increasing professional requirements take their toll, and so his academic curriculum may have so many premedical scientific studies as to lose most of the assumed humanistic savor. Those who have had occasion to meet with groups of doctors in discussion can find scant evidence to conclude that as a group and aside from their concept of personal service they have sociological or economic beliefs so clear as to excel those of the engineer.

The lawyer's education is more varied both in its amount of prelaw training and in its quality. At his best, the lawyer is quite possibly the most cultured and urbane member of his community. But despite the advantages which must be granted to intellects of the Holmes type, it is only fair also to remark that more than one thoughtful person feels that the legalistic approach to social and economic problems is one which may often at the outset discard a just, in favor of a plausible or expedient, solution.

Finally, the architect, least of all these groups, is likely to have enjoyed a well-rounded education in the humanities. Those studies which deal with the fine arts he has, but they are more concerned with esthetic than with ethic. Theoretically his study of architectural history should give him the historical view, but all too often it is the history of stone profiles and not of human profiles. Of sociology and economics he can boast no more than the engineer. Perhaps because of the burnishing furnished by the profession, perhaps because the profession attracts that sort of man, he is a more polished companion than the engineer, is better at expressing vocally his concern (his usually bewildered concern) over the present situation. But this attitude does not make him better fitted to plug the hole in the dike.

So, though education in, or perhaps better consciousness of, the human applications of a man's life is certainly needed if the engineer and scientist are to play the roles in society which they must surely play lest society come to chaos, it is doubtful that this education is to be found through the simple expedient of more courses in social sciences, letters, and the fine arts. Unless the engineering courses themselves are basic and unless those who teach them steadfastly breathe into them the warmth of human significance, no amount of classroom culture will avail. As a purely practical matter, moreover, still further demands for arts as well as technical specialization will inevitably result in the stifling of the genius of youth in the longer and longer years of the school.

In the long run in the modern world, then, the social position and the affluence of the engineer as compared with that of those of the other professions will rest on the degree of social responsibility he brings to the practice of his profession. If those who instruct him in his engineering and scientific principles fail to give social import to their instruction, he will remain a poor citizen or a poor engineer or both; if his teachers do ignite that spark, even though he be scant in his school experience of some humanistic disciplines, he has reasonable assurance of the social consciousness which is fundamental to the professional attitude.

This has all been epitomized by Dr. Jackson when he writes: "Civilization differs from savagery in the contrast of the security, comforts, conveniences, and intellectual amenities of life, but it is not true civilization unless its structure rests on a basic sympathy by all for the individual welfare of all human beings within the circle of contact." Dr. Jackson's students could absorb such principles while studying electrical engineering. Such absorption is also possible in every other field of science and its applications.

For Cleanliness and Clarity

THE American Society for Testing Materials has recently issued standard specifications "to help eliminate confusion in terminology, errors in filling orders, and lack of uniformity in testing" soap. They are the routine work of the society. The specifications encourage trade by promoting plain dealing and mutual understanding between the producer and the consumer. They are hardly news, unless it be through their ethical implications — unless it be that they are seen as indicative of an increasing tendency in American industry, a wholesome tendency lately emphasized by Federal legislation relative to foods and medicines, to call things by names which truly represent them. We believe in contracts; a spade is a spade, a promise a promise, and soap is soap — real soap, not soap inflated by a considerable content of water, or soap powder mixed with sodium carbonate or other chemicals, however valuable they may be. It is plain, good sense in the affairs of the market place, as it is simple necessity in the affairs of science, to know things as they are and to designate them accordingly. Know the truth and be free, at least from confusion.

Many of the materials which we use habitually are new products of the ingenuity of the chemists. Specifications are needed to tell us what (*Continued on page 268*)



United States Army Air Corps

Air Power and Diplomacy

Bombers as Components of a New Factor in the International Calculus—Its Bearing on America

BY FREDERIC E. GLANTZBERG

THE opinions or assertions contained herein are the private ones of the writer and are not to be construed as official or as reflecting the views of the War Department or of the Army at large.

DURING the four years of the World War, raids involving only three air squadrons, never over 40 planes, succeeded in dropping on London and its environs some 52 tons of bombs. Today, 24 modern bombers could release 96 tons of bombs not in a series of forays extending over many months but in a single attack. In the World War, however, the threat implicit in those 52 tons of bombs, although sporadically dropped by comparatively few planes and with but very slight effect in terms of people killed and property destroyed, succeeded in keeping 180 anti-aircraft guns, 300 pursuit planes, and 30,000 officers and enlisted men away from the other fronts in order to defend London.

Sharpening the edge of this contrast between World War days and the present are such exploits as the nonstop flight of

two British bombers from Egypt to Australia — a distance of 7,162 miles — and the speedy mercy flight of a United States bomber carrying supplies from Langley Field, Hampton, Va., to earthquake victims in Santiago, Chile, in a bit more than 50 hours, with two intermediate stops. The British nonstop flight covered a distance greater than the round-trip jump from London to Boston. The American mercy flight was of approximately 5,100 miles; the ship's carrying capacity may be estimated from the quantity of medical stores shown in the photograph on page 253.

Comparisons of this kind — or mere citations of specific cases of any kind, for that matter — do not possess much significance in themselves. They have meaning principally through their influence upon larger considerations. Essentially, the great increase in the threat of air attack which the comparison indicates is of import as it suggests the rise of a new factor with bearing on the relations between nations, with direct effect upon the negotiations in which nations engage. The most recent and most

Above. B-17 "flying fortresses" in formation over New York. These four-engined bombers, its complement of which the Army is currently developing, are powered by Wright Cyclones

"Flying fortresses" leaving Miami for the 5,000-mile journey to Buenos Aires. These bombers averaged almost 185 miles per hour in a flying time of 27 hours, 43 minutes. A stop was made at Lima, Peru

conspicuous of these is the Munich agreement of last autumn. The new factor which was of such potency in the Munich negotiations may be termed "air power." It demands explanation, for it remains as yet unfamiliar.

The training regulations of the United States Army declare the air power of a nation to be "its capacity to conduct air operations; specifically the power which a nation is capable of exerting by means of its air forces." But all aviation, it is argued, does not constitute air power. For example, our Army Air Corps is divided into two general classifications: One is called "air service"; the other, "air force." Air service consists of that type of aviation whose principal reason for existence is to coöperate with ground forces, to furnish eyes for the regulation of artillery fire, and to enable ground commanders to see what is going on "on the other side of the hill." Air force is composed of that type of aviation designed to enable the high command to attack and destroy enemy objectives the possession of which is vital for the enemy's successful prosecution of war. Such objectives would include the hostile air force, concentrations of supplies, factories manufacturing munitions of war, lines of communications, naval vessels, and key points in the enemy nation's economic structure. In other words, air service aids and assists ground forces in fighting the ground battle. Air force functions as an agency of national defense to assist the nation in winning the war. But, as armies and navies work together during certain operations to help each other, so do air forces work under certain conditions, with surface forces.

By this token, naval aviation is air service. True, this aviation carries guns, and drops bombs and torpedoes, but nonetheless it functions in direct support of the Navy, increasing the latter's efficiency and giving it more freedom of operation by protecting it against surprise attacks both from surface forces and from the air. But like the aviation assigned to the direct support of the Army, naval aviation is not employed strategically. It is used tactically, in close support of the surface forces in the furtherance of their particular missions. Such aviation does not become active until contact has been made, or is imminent, with an enemy land or sea force.

All air-force units in the Air Corps of the Army in continental United States are grouped together into an organization called the General Headquarters Air Force, frequently referred to as the G.H.Q. Air Force. This force is not part of any ground-force organization. It is designed to operate under the direct control of the supreme commander of the military forces. The G.H.Q.

Air Force, which is supposed to be ready for instant operations — as is the Navy — provides an agency by which the high command may create a sphere of air influence far out, in all directions, from our geographical

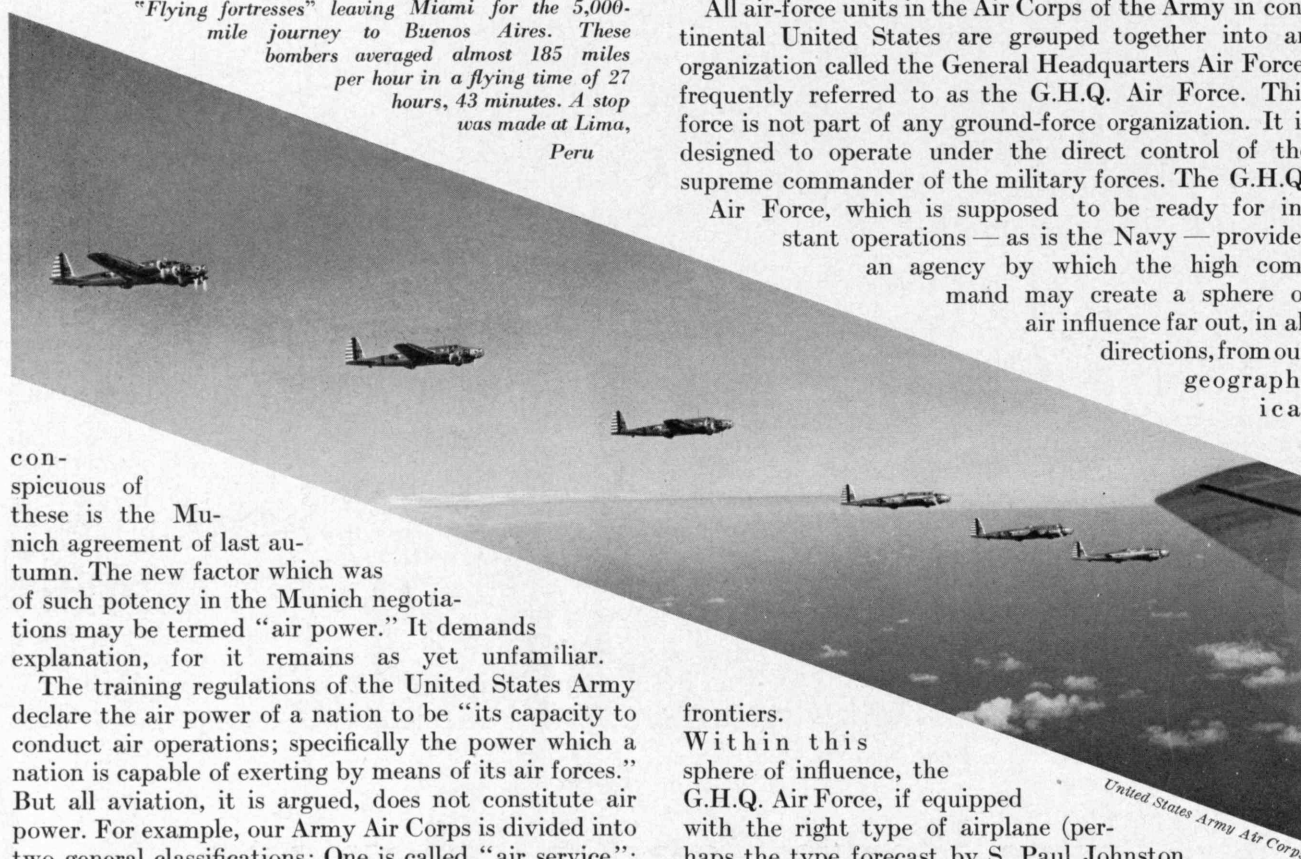
frontiers.

Within this sphere of influence, the G.H.Q. Air Force, if equipped with the right type of airplane (perhaps the type forecast by S. Paul Johnston, '21, in the December Review*) in sufficient numbers, could prevent the land, naval, or air forces of any enemy from getting close enough to this country to threaten our security. The G.H.Q. Air Force would thus act as a great covering force to shield and guard our vulnerable economic and social structure, the uninterrupted operation of which is vital to our ability to wage war or, for that matter, to continue to exist as a great and independent nation. The force would constitute air power in the full sense which the term has come to have in the calculus of diplomacy.

How the introduction of this term has altered the operation of the diplomatic calculus is easily to be seen, for instance, in the much headlined international situation of only four years ago: Mussolini announced his plans for Ethiopia. England, with the major portion of the British fleet concentrated in the Mediterranean, objected. Mussolini, with a comparatively small navy but with a strong force of bombing planes based within striking distance, said, in effect: "Hands off." The British navy promptly withdrew. This was the first demonstration the world had that air power had finally come of age. Developments since that demonstration were surveyed thus by Rear Admiral William H. Standley, United States Navy, retired, in an address last December:

The first disillusion as to the effect of aviation used independently came with Ethiopia, where it developed that airplanes had little effect except when used in conjunction with ground troops.

* See also Mr. Johnston's discussion of German air power in the *Saturday Evening Post* for February 18.



Then came Spain and the realization that the war was not to be settled in the air, that the air threat and bombs which destroyed public property indiscriminately and killed innocent women and children did not scare the populace into submission.

In China the same effect was observed. Japan has had uncontested control of the air, and while aviation bombing has ruthlessly destroyed cities and innocent men, women, and children, the war still continues. Air units have not captured or held a single position. Only once have aviation units landed in offensive operations. This was in a Chinese air field where they burned the hangars and planes in them and then took off.

And so the air-threat bubble which promised to supplant sea power as the dominating influence in world power seemed to have been punctured. *And then came Munich*, and while we may never know the inside story as to why England and France permitted Germany to work her will in Czechoslovakia, many writers have stated, and it is generally believed, that it was the fear of Germany's air power which caused England and France to accept Germany's terms concerning Czechoslovakia.

And so America sees, temporarily if you will, the domination in world affairs passing from sea power to air power, and from England to Germany. The parental protection having disappeared, the offspring must walk alone. America comes of age, and we find the United States now, for the first time in her history, embarked on a real armament program.

With all due respect to Rear Admiral Standley, I should like to make the following points with reference to his remarks about the Ethiopian campaign: Without a sufficiently strong bombardment force strategically based, that campaign must have failed at its inception when the British fleet barred the path to Ethiopia. Italy, a theoretically weaker nation, reversed the diplomacy of England by employing the threat of air power against England's navy. Furthermore, the commander in chief of the Italian forces in Ethiopia announced at the conclusion of the campaign that without aviation, there would have been no victory within the time it was accomplished. During its movement into Ethiopia, the advanced ground force received its supplies almost entirely by air, and its work consisted mainly in mopping up and occupying the ground which aviation had earlier cleared of opposition.

Possibly the English writer, J. M. Spaight, foresaw the developments at Munich when he declared in his book, "Air Power in the Next War": "History is full of the wars which are never fought. Air power will probably add to their number. Is it not conceivable that we are on a threshold of an era in which wars will be won before they are fought?"

Briefly, the Munich negotiators faced a Germany which had a navy one-fourth to one-third the size of Great Britain's; an army of 50 divisions of infantry equipped and ready to defend the Limes, or better-known Siegfried Line; but an air force of approximately 10,000 planes, about 3,500 of which were bombers and practically all of which were less than four years old. Germany was in a position to fight a successful defensive war lasting from six months to a year.

Opposing Germany's aims in Czechoslovakia were England and France. England had a comparatively weak air force, a small army, but the strongest navy in the world. France was also weak in the air as well as weak in sea power, but she had the strongest army in Europe. Stalemated at the Siegfried Line, England and France could not go to Czechoslovakia's aid without passing through either neutral country or country friendly to Germany. With a stalemate on the ground, Germany's air force provided the overwhelming power that forced the decision in her favor. *France and England were not bluffed; their combined hands were overcalled.*

The repercussions of Munich are not over yet. Germany is now asking for colonies, which may well provide a suitable location for a transatlantic air terminal for her South American commerce. The essential installations of a commercial base and a military base are identical. One can be used interchangeably for the other, so that a commercial base built within range of our centers of population is also a potential military base for use in air operations against our vital economic structure. If we are to engage in the commerce of the world today, we must face the inevitable construction of such bases within range of our key cities, for air travel is impossible without them. On the other hand, (*Continued on page 270*)



United States Army Air Corps

Below this Army Air Corps bomber, B-15, "big brother of the flying fortress," are the supplies for the earthquake area of Chile. These materials and an 11-man crew left Langley Field, Hampton, Va., at 6:33 a.m. on February 4. The plane reached Santiago, Chile, by 8:55 a.m. on February 6. Distance: approximately 5,100 miles. Stops: Panama Canal Zone and Lima, Peru

Blends of Nobility

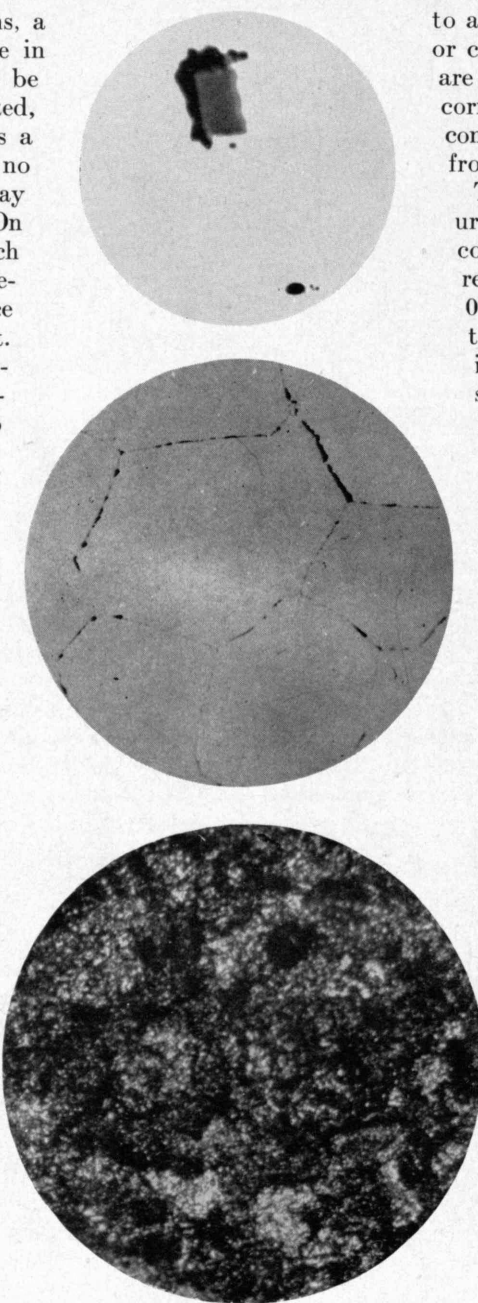
Wherein Metals and Men Are Different — Values of the Passive — Research into Alloys to Cut the Costs of Corrosion

BY JOHN WULFF

TO win nobility in human terms, a man generally must be active in affairs; thus he may hope to be singled out by a sovereign, knighted, ennobled. With metals, the story is a different one: To be passive, to take no part in surrounding events, is the way of the noble in the metallic world. On this contrast hinges a history in which the blade that cuts the morning grapefruit is an actor and in which the price of long metallic life affords the plot.

Prince and pauper, poet and alchemist long ago agreed in ennobling silver and gold. A who's who with scarcity as its standard would add to them platinum, rhodium, and palladium. The electrochemist's almanac of royalty, however, allots rank by a different rule — that of electrochemical potential. By this criterion, the more noble the metal, the more inert — the more passive it is to the action of corrodents. The baseness of a metal is, accordingly, measured by the activity with which it succumbs to corrosive solutions. The electrochemist has ranked the metals numerically according to their degree of nobility, but he knows of metals which are active in some solutions and passive in others. Chromium and nickel behave in this fashion. Even the base metal iron may be passivated by fuming nitric acid, as we shall see.

The metallurgist follows the chemist's almanac. He is, however, concerned not alone with the corrodibility of a metal but also with its hardness and its strength. Since paint and other coatings properly applied preserve, as well as beautify, the common metals which he can alloy slightly and thus cheaply, he is often content — but not for long. The alchemical urge in him leads him



Point, line, general: Thus may corrosion attack even the best of alloys if their surroundings are improper. Top. Pit corrosion by ferric chloride adjoining an inclusion — the light rectangle (magnification 200 times). Center. Line corrosion by the same agent along grain boundaries (200 times). Bottom. Pit and line corrosion merge in general attack by a hydrochloric acid solution (100 times)

to alloy chromium and nickel with iron or copper to produce materials which are strong and which are durable under corrosion. This is sound practice if we consider the tremendous annual losses from corrosion.

These losses permit of startling figures. Reckoning in terms of weight, a conservative engineer of professional repute estimates that of the 1,200,000,000 tons of iron and steel in the world two per cent fail each year because of inadequate protection against corrosion. In 1932 the world production of iron and steel products was but five per cent of that total. Another authority weaponed with dollar statistics writes that in the oil industry the annual cost for replacement due to corrosion is about \$175,000,000 and in the chemical industry, about \$250,000,000. The gas-distributing companies of California are known to have a replacement bill, thanks to corrosion, of \$5,000,000 a year. To protect iron and steel against this demon, \$125,000,000 are spent each year for paint and \$65,000,000 for electroplating, dipping, and other metal platings.

Such tremendous economic losses concern all of us. To cut down waste of this kind ultimately serves to reduce the cost of living. What are we doing to study corrosion and means of prevention? Of about \$2,500,000 spent last year in the United States on research relating in some way to the subject, only one-eighth was devoted to basic studies; one-fourth went for practical service tests; and the remainder was apportioned to developmental work.

What do we mean by corrosion? Simply the destruction of useful materials by chemical or

electrochemical action. Although it differs from wear or erosion, these factors may operate simultaneously with it. Recent work here and abroad has shown that the initial products of corrosion may serve to protect some metals and accelerate the dissolution of others. How quickly a metal corrodes depends not only on its past chemical and mechanical history but on the nature and temperature of the corrodent.

That some metals develop a protective film and thus retard corrosion was first suggested by Faraday. He attributed to the formation of a passive film made of oxygen or oxide the temporary inertness of iron after it has been dipped in fuming nitric acid. Faraday seems to have been aware of the fact that if this film could be made more stable, its presence would make for corrosion resistance. Although other passivating agents and the possibly good effects of alloying occurred to him, he dropped the subject at that time for the more fruitful field of electromagnetism. Faraday's electrochemical work stimulated other workers, yet most of them were absorbed with pure metals that exhibit passivity, and consequently little thought was given to alloys. In spite of the fact that chromium was known to be passive in most solutions but active in some, metallurgists who made chromium-iron alloys some 40 years ago were misled by the accelerated corrosion tests that they had made.

That this should hold also for nonchromium alloys did not occur to these researchers until 1909 to 1912, when simultaneously in England, Germany, and the United States, in their hunt for alloys which would resist oxidation at high temperatures, three different groups of workers found that the chromium-iron and chromium-nickel-iron alloys would also resist atmospheric corrosion remarkably well. Indeed Faraday's original speculations, as well as the experiments of numerous pure scientists, were found to hold true. If sufficient chromium were added to iron, the alloy would passivate in air. About the same time a natural copper-nickel alloy, natural because the metal was one from Canadian nickel ores which had the same copper-nickel ratio, was also found to be resistant to many different kinds of ordinary corrodents.

Out of these researches a sizable industry has grown. Last year nearly 100,000 tons of iron-base, stainless alloys containing chromium were produced in this country alone. Today so many different corrosion-resistant

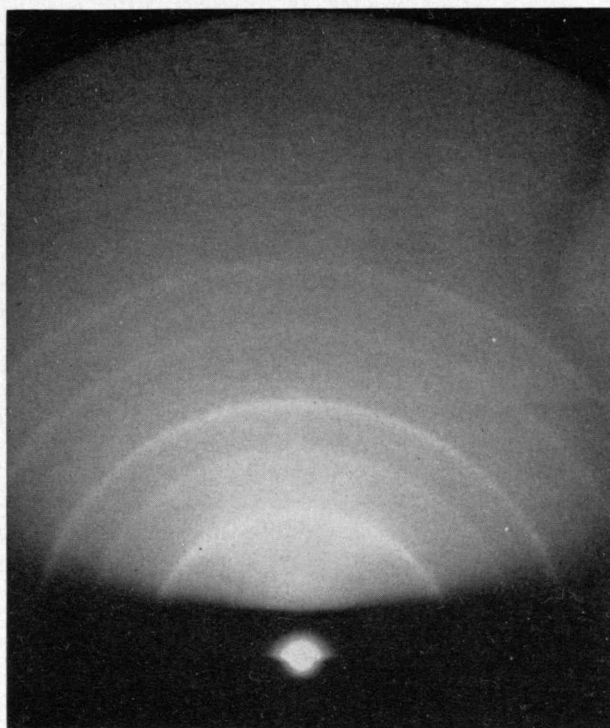
alloys are marketed and under such fancy names that advertisements in trade journals read like the minutes of an alchemist congress in ancient Babylon. Only yesterday the pamphleteers of progress were calling this the age of alloys. (Today it is plastics.)

Many a homily has been written as the result of the rapid development in alloy composition. If we wish to extricate ourselves from the magic of trade names, a perusal of the chart on the next page is initially helpful. It gives the weight loss of various common groups of industrial alloys after immersion in the sea water of the harbor of Eastport, Maine. Saline solutions are particularly nasty corrodents. In viewing the chart the reader should remember that the comparison delineated is but for one particular set of conditions and might not hold if the alloys had different pretreatments or were immersed in other mediums. Again, weight loss is not always a sound criterion for judging corrosion resistance. Some materials, like iron, are attacked generally; others, like chrome irons and cupronickels, locally. Though weight loss of alloys in sheets is small, local pitting may cause practical failure, whereas extensive general rusting, as with iron, may preserve the structure beyond its period of usefulness. Nevertheless the chart is useful in showing that all the alloys corrode in sea water and that the term corrosion resistance is but relative.

Three major groups of corrosion-resistant materials have found widespread application during the last 25 years; namely, iron-base, nickel-base, and aluminum-base alloys. In some engineering installations, questions of taste and expense determine the particular choice,

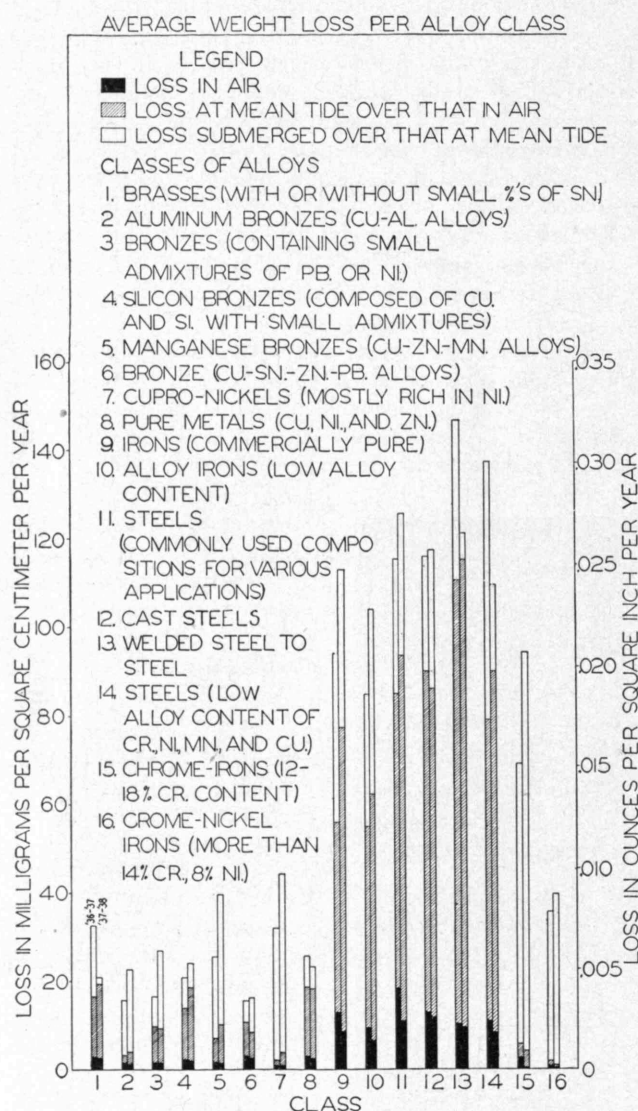
but more often weight, strength, and workability coupled with low- or high-temperature corrosion resistance in definite mediums dictate the use of a particular group.

Wherever this truth has not been realized, both maker and consumer suffer. For the present, discussion of but one of these alloy groups is necessary, and since the development of the iron-base alloys bids fair to increase in application in the future, they only are here considered. Their excellent all-round properties in addition to corrosion resistance make one wonder why they have not been more widely applied. Expense cannot be the only reason; perhaps the tremendous number of different compositions marketed for the same purpose makes the consumer wary and puts the manufacturer in the red. Another group of advisers maintain further



An electron diffraction pattern of the cold-rolled surface of a stainless alloy which showed crystalline structure entirely different from that of the interior of the alloy. Corrosion tests showed the nature of the crystalline phase of the surface did not affect the pitting of this surface as much as the mechanical inhomogeneities due to the previous severity of cold-rolling

that when these alloys are marketed not as steel but as unique alloys of a few definite compositions for definite purposes in the manner that aluminum and nickel alloys are marketed, the industry will cease to be adolescent. This change would require patent pooling much in the fashion of the automobile industry, the same critics maintain. Either way, published commercial, industrial, and scientific research is necessary if the engineering and commercial possibilities of these alloys are to be realized. All of this is, however, industry's problem, and survival is already hewing a path in the proper direction; our problem concerns the passivity and corrosion resistance of these alloys, not their marketability.



A comparison of the relative corrodibility of various classes of industrial metals and alloys immersed in the sea water off Eastport, Maine. The comparison is based on measurements of loss of weight only. In classes 2, 7, 15, and 16 loss of weight at mean tide and during total submersion can be attributed mainly to pitting. One sample of class 15, containing more than 18 per cent chromium, eight per cent nickel, and three per cent molybdenum, showed the least weight loss of all samples under the three sets of conditions and showed no evidence of pitting after two years' immersion. The chart is based on data from the Materials Corrosion Investigation, United States Engineer Office, Boston

Some metallurgists divide the stainless-iron alloys into three major structural groups: pearlitic, ferritic, and austenitic. They may thus be explained for non-metallurgists: The first group contains between 13 per cent and 15 per cent of chromium and is sufficiently high in carbon to be hardenable by proper heat treatment. When polished, such alloys resist the corrosive action of air, moisture, and fruit acids—a characteristic which accounts for their application to cutlery. Unpolished, they show a marked drop in corrosion resistance. The ferritic alloys in usual practice contain from about 13 per cent to 30 per cent of chromium and more often are held low in carbon. They are employed where more corrosion resistance is desired and hardness may be sacrificed. Those of about 18 per cent chrome content were first used in the construction of a nitric acid plant where their corrosion resistance proved highly successful. In this composition they can be hot- or cold-worked and are reasonably low in price. Their pleasing appearance when polished, coupled with their immunity to a broad range of corrosives, accounts for their widespread application for domestic purposes, for dairy equipment, and for decorative work. In sea water and a few other corrosives they pit profusely; pitting is a nasty type of local corrosion more injurious to sheet than to bulky parts.

Adding from eight per cent to 22 per cent of nickel to those of 18 per cent chrome content produces the third class of alloys—austenitic—which is definitely more corrosion resistant than both pearlitic and ferritic. Where unusual structural properties are required, where equipment must operate at elevated temperatures, where contamination of product must be avoided, and where severe corrosive conditions must be met, this class finds wide application. Were it not for their high price (which is due to their nickel content), they would find even more extensive application. The usual composition employed is more often marketed as 18:8 (18± per cent chromium and 8+ per cent nickel). It is fairly soft and ductile, but its strength may be increased by cold-working. Where increased strength is not required, its work-hardening properties do, however, increase machining costs. If the alloy is employed for any length of time at temperatures around 750 degrees C., the carbon in it precipitates as a carbide in the grain boundaries, lowering appreciably the strength and the corrosion resistance of the alloy. The central cut on page 254 illustrates grain-boundary attack of this kind. If, in the properly heat-treated state, the alloy contains small amounts of titanium or columbium, this type of deterioration may be avoided. The alloy will, of course, dissolve in hydrochloric acid (a severe test) more readily than the cheapest iron. It pits when used in contact with saline solutions, although less severely than do straight chrome alloys. The addition of some three per cent molybdenum to the usual 18:8 composition decreases nearly tenfold its susceptibility to pitting in sea water. Of all the specimens in the accompanying chart, an 18:8 alloy containing molybdenum showed the lowest weight loss, was free from pits after two years of immersion, and when cleaned of marine growth appeared as bright as on the day it was immersed. If bromide solutions (Continued on page 274)

From the Mountaintops

How a New Technique in Radio Broadcasting May Be a Tocsin to the Industry

BY DONALD G. FINK

NOW abuilding are two radio broadcasting stations of revolutionary design, which, like the prophets of old, shall call down from the mountaintops — from the summits of Mount Washington in New Hampshire and Mount Asnebumskit, near Worcester, in Massachusetts, where pioneering installations of frequency-modulation equipment are being made by the Yankee Network. No ordinary receiver can handle these broadcasts, but the extraordinary receivers specially designed for the service will give radio a quality which a British reporter has called “ghastly in its realism.” There are those who say that these quiet preparations herald a technological revolution of major proportions; others who feel that the new system cannot displace the tremendous investments in the old. But all who have heard the new technique of broadcasting agree that the quality of sound reproduction is like nothing generally heard heretofore. Behind this array of convincing evidence and conflicting opinion lies one of radio’s most interesting sagas — the old story of pioneering, skepticism, proof, and conviction.

Frequency modulation, as the new system is known, has had two periods of development: that prior to 1924, at the end of which many were convinced that the system was useless; and that subsequent to 1928, when it

began to appear that the system was superbly useful. The change of opinion is due largely to one man, Major Edwin Howard Armstrong, whose name has long been associated with radio. In the words of one observer, Major Armstrong has “rung the bell” three times in radio — with his contributions of the regenerative circuit, the superheterodyne circuit (the basis of 95 per cent of all modern receivers), and the superregenerative circuit. Frequency modulation bids fair to be his fourth stroke, and if his hopes are fulfilled, it may well be a tocsin for all the radio industry.

The technical explanation of frequency modulation is not so difficult

as the words make it sound. Radio broadcasting is carried out by passing alternating current of very high frequency (several millions of cycles per second) through the transmitting antenna, which thereupon radiates some of the electric energy into space. When it is desired to transmit intelligence by means of such radiated energy, it is necessary to vary some characteristic of the alternating current. Ask any sophomore in electrical engineering what characteristics may be varied in an alternating current and he will at once answer: “Amplitude, frequency, and phase.” The amplitude is the strength of the alternating current in amperes; frequency, the number of alternations completed in a second; and phase, the timing of the alternations relative to a fixed time reference.

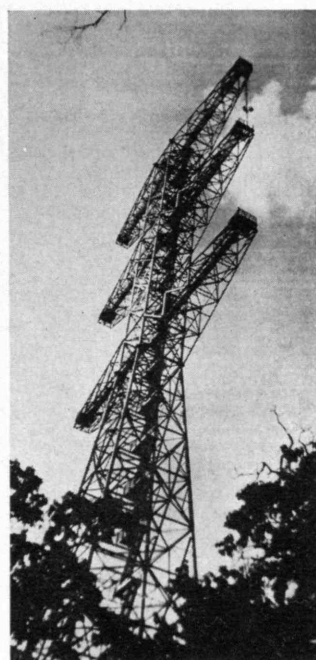
In ordinary broadcasting the *amplitude* of the alternating current is varied in accordance with the variations in air pressure which impinge on the microphone; this is the system known as amplitude modulation of the radio wave. That the system is successful the universality of radio broadcasting well proves (in this country there are about six million more radio sets than there are automobiles). But radio is not an unmixed blessing. Assuming (for argument only) that an ideally perfect program is to be broadcast, the program can be imposed on the radio wave in ideal fashion, but there the engineer’s control ceases. Between transmitter and receiver there are countless sources of interference, known generally as noise, which can, and too often do, mar the reproduction. Atmospheric static, hisses arising in the amplifier tubes and circuits, and man-made static from automobile ignition systems, oil-burner and refrigerator motors, telephone dials—all constitute an unholy alliance detrimental even to programs from near-by stations.

In frequency modulation, the intelligence is imposed on the radiated wave not by changing its strength or amplitude



Beverly Dudley, '36

Antenna tower of the frequency-modulated station on Mount Washington



Electronics

The 400-foot tower at Alpine, N. J. Antenna between cross-arm ends, upper right

but by varying its *frequency*. In a manner of speaking, there is no fixed point on the dial at which a frequency-modulated station may be received; rather, it wanders over the dial with great rapidity. Each of its excursions is caused by a corresponding variation in the air pressure impinging on the diaphragm of the microphone. To receive such wandering waves, it is necessary to provide the listener with a receiver which is responsive to variations in the position of the station on the dial. This is an oversimplified statement of the problem, of course, since frequency-modulation stations are tuned in much as ordinary stations are, and the range of frequency variation is narrow. But the effect is very much as if the receiving set takes cognizance of the change of frequency of the transmitting station and interprets the variations to the loud-speaker. The latter thereupon reproduces them as variations in air pressure which are more or less exact copies of the original sound-pressure variations in the transmitting studio.

This idea is far from new. The old "arc" radio transmitters were keyed into the dots and dashes of the Morse code by a key which simply changed the frequency of the station. The dots and dashes corresponded to the frequency to which the receiver was tuned; the blank spaces between, to frequencies to which the receiver was not tuned. The extension of this idea to the continuous modulations required for telephonic broadcasting was not so simple. In the penultimate stage of its development, the frequency-modulation system was declared by experts (whose reputations are still on the highest plane) to have no value and in fact "to distort inherently" the variations of music or speech carried by it. By 1928, however, the ultrashort wavelengths, ideally suited to this technique, had been explored and opened up for use. Using this region of the spectrum, Major Armstrong devised a system of transmission which would permit much larger variations of the frequency of the wave than had been theretofore considered — a system which, contrary to prior opinion, did not distort the intelligence imposed upon it.

An immediate, and unlooked for, virtue was a strange lack of noise. Major Armstrong had worked earlier with Dr. Michael I. Pupin trying to conquer static, but he had given it up. The frequency-modulation system did not, on the face of it, have any advantage with respect to static. But experience soon showed a remarkable effect: The frequency-modulation system was curiously quiet, curiously free from annoying noises and hisses. And the more vigorous the frequency swing employed, the freer from noise the signal became. The explanation was found in the natural character of the noise. Radio noise is, of course, in itself an alternating current which possesses variations in amplitude, frequency, and phase

just as does any alternating current. But — and here the great discovery appeared — the frequency variations associated with most noise sources are small. By making a receiver responsive only to frequency changes, the interference produced by this aspect of noise variations was made correspondingly small. By employing wide frequency swings for the desired signal, the signal could be made correspondingly strong relative to the noise. Therein lies the whole story.

Conventional amplitude modulation can be made effective against noise only by increasing the variations of signal amplitude relative to the variations in noise amplitude. Offhand it would appear that this means could be used to overcome noise, but the rub is that increasing the amplitude of the signal variations requires increases in the power of the transmitting station. And power comes high not only in its own cost but in the cost of the transmitting equipment required to generate and

modulate it. Frequency modulation can gain an advantage over noise, without any increase in power, merely by increasing the range over which the frequency swings. This technical advantage is enough in itself to recommend the new system. But the real advantage is that a frequency-modulation station of moderate power can so overcome the noise that the circuit is completely quiet when there is no music or speech present — so quiet, in fact, that it appears that the receiver has been turned off entirely.

The system can be engineered, once the basic quiet

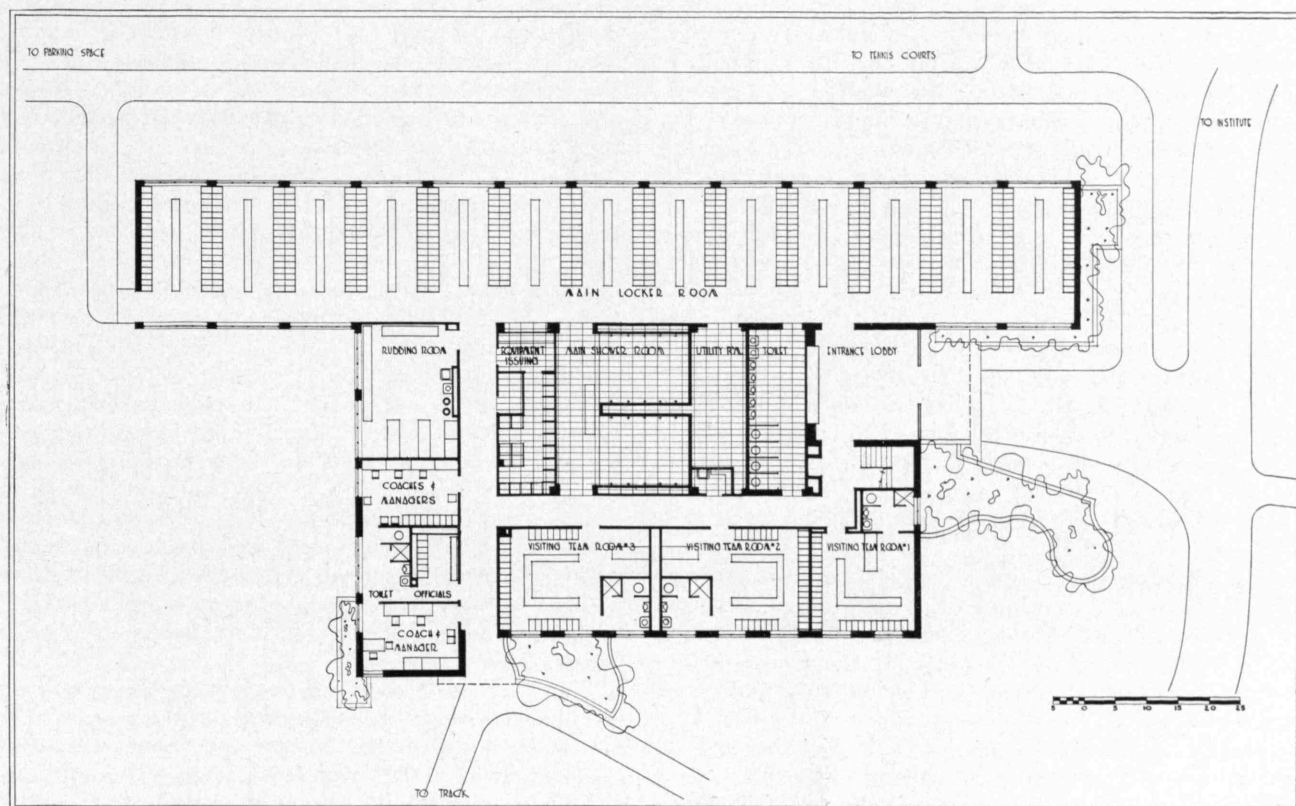
of the transmission circuit has been established, to provide remarkable realism in sound reproduction. The full dynamic range from a pianissimo to a crescendo can be accommodated readily within the confines of the circuit; whereas in the conventional system, the noise may limit the clarity of the soft passages, and the power capabilities of the station may limit the quality of the strongest passages. To this great range of response of the new system is (or can be) joined a wide pitch range — from 40 to 15,000 cycles per second without discrimination. In demonstrations, paper torn before a microphone sounds at the loud-speaker exactly like paper being torn, not like a radio reproduction of paper being torn, and even such "soundless" events as the lighting of a match, the lighting of a cigarette, and the blowing out of the match, are reproduced as if they occurred at one's elbow. A bell rung hard, so that the dissonant overtones are especially prominent, sounds under these conditions precisely like a bell being rung hard, since the off-key partials lose nothing of their true character in the transmitting. And music, of course, benefits likewise.

The need for mountaintops in the broadcasting of frequency-modulated waves arises from the use of the ultrashort waves. These short (Continued on page 280)



Part of the final output amplifier at Alpine. The transmitted program is carried to the antenna by the ropelike wires in the foreground

Electronics



Inside: the efficient floor plan of the new field house made possible by alumni endeavor

To Serve Sports

Plan of the New Field House, Now Well Along in Construction — Efficiency and Effectiveness Combine in First Project of the Alumni Campaign to Improve Facilities

THE new field house, first project in the broad program of development of athletic and recreational facilities sponsored by the Alumni Association, is well along in construction, the roof slab being in place. Both the irregularity of its plan and the ruggedness of its finish will contribute to making the completed building informal and colorful as a background for the activities it will house and entirely in harmony with the playing fields which will surround it. It will be, moreover, as inspection of the accompanying plan shows, highly efficient in carrying out the purposes for which it was designed. In developing this building, Professors Lawrence B. Anderson, '30, and Herbert L. Beckwith, '26, of the Institute's School of Architecture, from whose drafting boards the plans came, have kept in mind other related projects scheduled for the future.

The new field house will be the focal point of an outdoor athletic area on the Institute's land west of Massachusetts Avenue to complement the indoor athletic center contemplated for the land east of the avenue adjoining the Barbour Field House and occupying the

site of the old track. Furnishing locker-room and other facilities for participants in track, tennis, lacrosse, soccer, and cross-country, as well as in Field Day events, the new field house will be adjoined by playing fields, tennis courts, and the new track. The concrete tennis courts, which have been in use for a number of years, are to the east of it; the lacrosse and soccer field is to the south; the new track, to the west. The area to the north has been reserved for a cage to include an indoor track and playing areas for winter use by field sports. This cage will be constructed sometime in the future and will be joined to the field house by a covered passageway.

Four hundred and fifty men can be accommodated in the general locker room of the new building. Also provided are three rooms for visiting teams, a rubbing room, two offices for coaches, a dressing room for officials, as well as shower baths and toilet facilities. The main locker room has been designed to give ample dressing space in front of the lockers without the use of an extravagant amount of floor area. The problem of

adequate locker-room space is particularly important at the Institute because of the fact that the Technology curriculum does not permit distribution of practice periods throughout the day. Since the lockers are to be low in height though generous in capacity, the room itself will have a light and open quality which will be enhanced by the arrangement of the lockers in tiers dividing the room into 13 alcoves, each of which will be lighted by a five- by ten-foot window located in the east wall. The walls of the room, moreover, are to be of a light, neutral gray, with the lockers red and the doors dark blue. This color scheme will be repeated with variations in other portions of the building. All lockers will be connected to the exhaust ventilating system, assuring a constant removal of odors and a rapid drying of equipment.

The entrance lobby of the field house will be located on the south, toward the general approach from the main Institute buildings. Opposite the entrance wall of glass will be located a specially lighted built-in trophy cabinet of plate glass and birch plywood. From the lobby one may go to the right into the main locker room or to the left into corridors leading to the visiting-team rooms, the coaches' offices, the officials' room, and the track entrance on the west.

Notable about the new building is the fact that all the rooms in it will receive direct light from windows rather than from skylights. The beneficial effects of sunshine and natural ventilation are thus assured in mild weather. The main shower room and main toilet room, placed in the center of the building so as to be easily accessible from both the visiting-team rooms and the main locker room, would be cut off from window ventilation but for the fact that the architects have set the ceiling of this section sufficiently higher than adjacent portions to assure adequate light from windows placed in the wall above the roof of adjoining sections of the building. The clerestory wall thus created will also be used for the air intake and exhaust of the heating and ventilating systems, the fans and heaters being located directly above the utility room. And the elevated central roof

itself is put to good use: Connected with the building by a stairway, it will be protected on the north by a brick wall and will be equipped with a wood floor, mats, and a movable semicircular canvas wind screen, and thus will make possible a long season for devotees of sun-bathing. Location of the shower-room unit thus in the central portion of the structure, besides contributing to this unusual adaptation of plan, is also desirable because it permits concentration of plumbing on either side of a central utility space. All pipes, ducts, and conduits in the building are to be placed in concealed spaces which will serve a double purpose, being utilized also as exhaust flues.

The building is supported on caissons and grade beams, and has concrete floors poured on grade. Exterior walls are brick of a light, warm, grayish color. The interior walls will be of gray facing tile except in showers and toilets, which will have tile floors and tile dados. The roof will be of reinforced-concrete beam and slab construction, insulated with cork. The use of paint has been kept at a minimum throughout the building in order to insure economy in maintenance during the future.

The playing fields to the west of Massachusetts Avenue have always been kept busy in the past, so that it is to be expected that the new field house will be in constant use, for the availability of such accommodations in close proximity to the fields themselves may be counted on to bring out more participants in the various sports.

The completion of the new building, which will be ready for use in relatively few weeks, together with the completion of the new track west of the avenue — most of the work on which has already been done — will mark the definite beginning of the program of expansion of the Institute's athletic and recreational plant in which Alumni have taken the lead. The construction of a swimming pool is expected to be undertaken late this year, and further units in the general program are to be built as the funds for them become available.



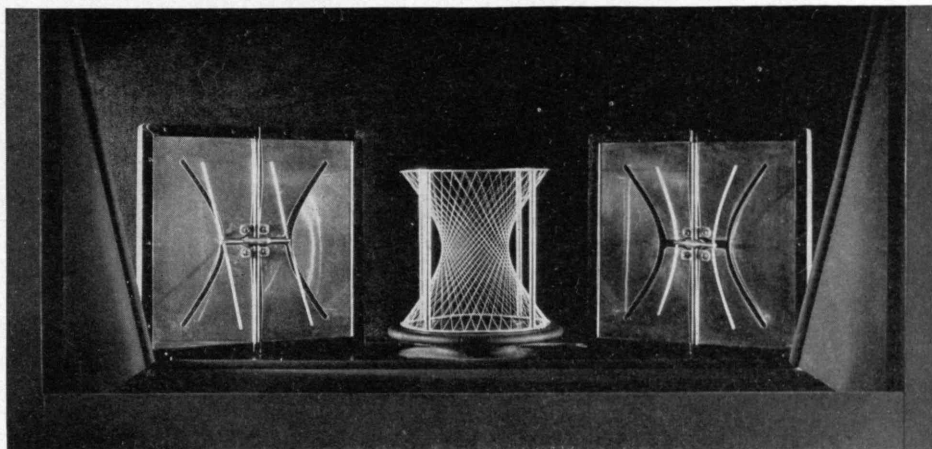
Outside: the effective mass of the new building as it appears in model embodiment

William F. H. Purcell, '38

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

Mechanized exhibit of mathematical models, built in the Institute's Hobby Shop by Edmund B. Hammond, '40, under the direction of Professor Raymond D. Douglass, '31, of the Department of Mathematics (see page 262). A motor in the base of the case causes the configurations of rods at left and right to rotate and illustrate the generation of a hyperboloid of revolution as represented by the model at the center



M. I. T. Photo

Heritage of Scholars

ACADEMIC freedom is freedom and opportunity to search for the truth and to declare the results and conclusions thus drawn from competent and careful analyses." In these words President Compton, in an address before the Technology Club of Chicago on March 2, ably defined the precious heritage which has its roots in the age-old respect for the knowledge and disinterested pronouncements of scholars.

"Quite naturally," said Dr. Compton, "academic freedom has encountered occasional opposition. When, in the Middle Ages, the church, contrary to the knowledge of navigators and informed scholars, enforced the teaching that the earth was flat, with four corners, academic freedom was violated. When, within our generation, states or religious bodies forbid study of evolution in our schools, again academic freedom suffers. We do not worry too much about such violations, unfortunate as they are, because we feel sure that in the long run scientific truth will prevail over ignorance.

"Recent interest in the subject, like that which led to the nation-wide meetings under the auspices of the Lincoln's Birthday Committee for Democracy and Intellectual Freedom, has arisen from two new threats to academic freedom: the 'teachers' oath' laws in several of our states and the control of teaching for political purposes in the authoritarian countries of Europe. The latter we all condemn: Distortion of truth in teaching is dishonest, cowardly, and dangerous; it is a move backward in man's long struggle for a nobler life; it is abhorrent to our ingrained American belief that honesty is the best policy and to the Christian doctrine, 'Ye shall know the truth, and the truth shall make you free.'

"The teachers' oath bills are, I believe, far less serious, because no American should object to subscribing to that Constitution which guarantees him his right to life, liberty, and the pursuit of happiness. The threat to academic freedom here comes from danger that this law is a precedent for further more exacting political regula-

tion of teaching and from danger of abuse. For example, a geography teacher tells her class that Russia is the largest country of the earth; a parent reports to a political agent or to the American Legion that this teacher is praising Russia over the United States; the teacher's job is threatened on a charge that she is a communist; so the teacher and her colleagues decide not to mention Russia in the future and leave their pupils in ignorance of this important country. 'Silly,' you say. 'Silly,' say I also, 'but unfortunately true.'

"So whenever I hear a colleague or a group laud academic freedom and urge its vigorous defense, I say, 'Amen.' Yet sometimes I confess to a feeling that much of this talk, like flag waving, is an emotional gesture done without adequate realization of its significance. Let me, therefore, mention a few of the things that I should like to hear stressed more often when academic freedom is discussed: Freedom, whether academic or otherwise, has first to be won and then to be maintained. Theoretically we may hold, as we hold to a religious tenet, that freedom is an inalienable human right; historically and practically this is not so, for freedom has been won only after long struggle. In our Anglo-Saxon heritage, the Magna Charta of 1215, the Bill of Rights of 1689, our own Declaration of Independence of 1776, Constitution of 1787, and Emancipation Proclamation of 1863 are landmarks in the up-and-down struggle which has given us that degree of freedom which we enjoy today. This struggle is a hard one, and the issues are very complicated: Forces of ambition and selfishness in powerful individuals or groups will always threaten the freedom of others; as life becomes more complicated, some liberties must be surrendered in the interest of social order and so that other larger liberties may be retained — and not all people agree on which ones should be surrendered and which ones retained. Our democratic form of government was designed as an operating framework within which these problems could be decided and liberty made available to the people under their own control.

"So we see that freedom is not a clear-cut quality but is rather a principle which is applicable only with qualifications and compromises. What we possess of it was won with great difficulty. And just as much care and character will be required to keep it as were involved to win it. Some forces attack freedom boldly and powerfully, as did the Nazi and Fascist revolutions; other influences undermine it subtly, as do petty regulations like teachers' oath laws and as does the increasing tendency of government to behave as the master and not the servant of the people. But there is, to my mind, one very fundamental attribute of freedom about which we think too little: Freedom carries with it a responsibility to be worthy of that freedom. Freedom, in the last analysis, can be won and maintained only by deserving it. If we concentrated more effort on being worthy of freedom, we should not have to get so exercised over danger of losing it.

"Turning to the academic field, what must we do to secure academic freedom? But first: just what is 'academic freedom' anyhow? Academic freedom is not license to rant or to promulgate half-baked ideas or prejudices ad libitum. Nor is there any academic freedom to loaf or to stagnate on the teaching job, with guarantee of lifelong support from funds paid by students to secure an education or donated by philanthropists and made tax exempt by our government in order that the great cause of education shall be furthered. The organized defense of academic freedom has been so effective that college administrators have a healthy hesitation about firing (or not reappointing) instructors even for good cause. It is said that the safest job holder in the United States is the professor of sociology who publicly advocates some un-American doctrine, for however incompetent he may be, he cannot be dropped without the college's being subjected to the charge that he is being muzzled or disciplined for expressing his convictions — an abuse of academic freedom. Academic freedom exists not as an inalienable right but as something accorded by the public to the academic profession out of the respect which the profession has earned. If ever the public loses respect for the wisdom, judgment, and social value of the teaching profession as a whole, then academic freedom will, in my judgment, disappear.

"So I should like to emphasize academic responsibility as being essential to, and even more important than, academic freedom. Too much constructive thought and effort cannot be given to improving the value of our educational institutions to the communities which they serve. Any faculty member who is stagnant, incompetent, erratic, prejudiced, uninspiring, unproductive, or otherwise unable to command the respect of thoughtful people by the quality of his performance in his job, is a real threat to academic freedom. Likewise, that college administration which does not, with reasonable effectiveness, maintain an able staff and an alert program of socially valuable activities is a threat. So, while defending academic freedom in our writings and speeches, may we also safeguard it by our actions — by working for that high accomplishment in our educational institutions which will command the respect of the public, on whose support academic freedom depends."

The Hobbyists Progress

STUDENTS who take pleasure in giving outlet to their innate desires to make things with their hands are among recent benefactors of the Institute, as is demonstrated by the many fine exhibits which they have designed and constructed in the Hobby Shop for the Technology Museum. The pride of the group is the mechanized exhibit of mathematical models which Edmund B. Hammond, '40, planned and built under the guidance of Professor Raymond D. Douglass, '31, of the Department of Mathematics and which has been put on display in the hallway of Building 2. A model of a loom appears in the textile exhibit just off the main lobby of the Institute.

Other museum displays will include a careful model of a glass factory, now in the process of construction; an exact replica of the first telephone instrument of Alexander Graham Bell, which is nearly completed; a pottery exhibit; another mathematical exhibit which will illustrate certain mathematical functions by means of gears; and an illustration of the refraction of light through prisms. In cooperation with Professor John G. Trump, '33, an accurate model of the new 1,250,000-volt electrostatic x-ray generator is being prepared for the Technology exhibit at the New York World's Fair.

To one who now visits the Institute's year-and-a-half-old Hobby Shop after an absence of a year, the most striking feature is the extent of its growth: It has grown in physical size, in equipment, in organization, and in its value both to the students and to the Institute, and thus has become more than a workshop. In many ways, it has come to be a club for student craftsmen under the particular leadership of about a dozen undergraduates who have been steady users of the shop and have added immensely to its equipment and facilities by the unselfish donation of their handiwork. One can hardly put a hand on a thing which hasn't been built, partially built, remodeled, improved, repaired, or at least installed by the shop enthusiasts themselves. Benches, shelves, gears and other parts of the machine tools, special lights, pieces of special equipment, whole doors, and even some of the walls have been made possible through the work of students interested personally in seeing the facilities grow.

The Hobby Shop was started in the fall of 1937 by a student group under the guidance of Arthur C. Watson, chairman of the Technology Museum Committee. A small room in the basement of Building 2 and a few of the more important woodworking and metalworking tools were loaned or donated by various Departments. Since then, the students have become more and more interested in the use of the room, and the number of users has become so great that, even with an enlargement of the room about doubling the floor space, it has been necessary to set aside Saturday afternoons for the regular members.

A dozen of the shop users of long standing have formed an organization, calling themselves the Master Craftsmen. They have taken the responsibility of governing the use of the shop, of seeing that the most interested students get the benefits of the shop facilities, and of setting up shop rules for the proper care of the ma-

chinery and the safety of the users. The largest body of "members" of the Hobby Shop is composed of journeymen, *i.e.*, members who have demonstrated their sincere enthusiasm for the objectives of the shop. Whenever a vacancy occurs among the master craftsmen, a journeyman may be named for promotion. An applicant for membership must fill out the necessary form and in order to become a journeyman he must, during an apprenticeship period of four weeks, work in the shop a total of not less than six hours and convince the master craftsmen of his enthusiasm and sincerity in not only working on his own hobbies but also assisting in the upkeep of the shop. A shop foreman and a steering committee are selected periodically from among the master craftsmen to act as administrators and coördinators of the activities of the shop.

A handbook is now being planned and written which will give the apprentices the information they are expected to know. Such publications and notices are run off on a mimeograph machine which was donated to the hobbyists' use. Miss Charlotte Douglass, daughter of Professor Douglass, gives her services as typist and general secretary.

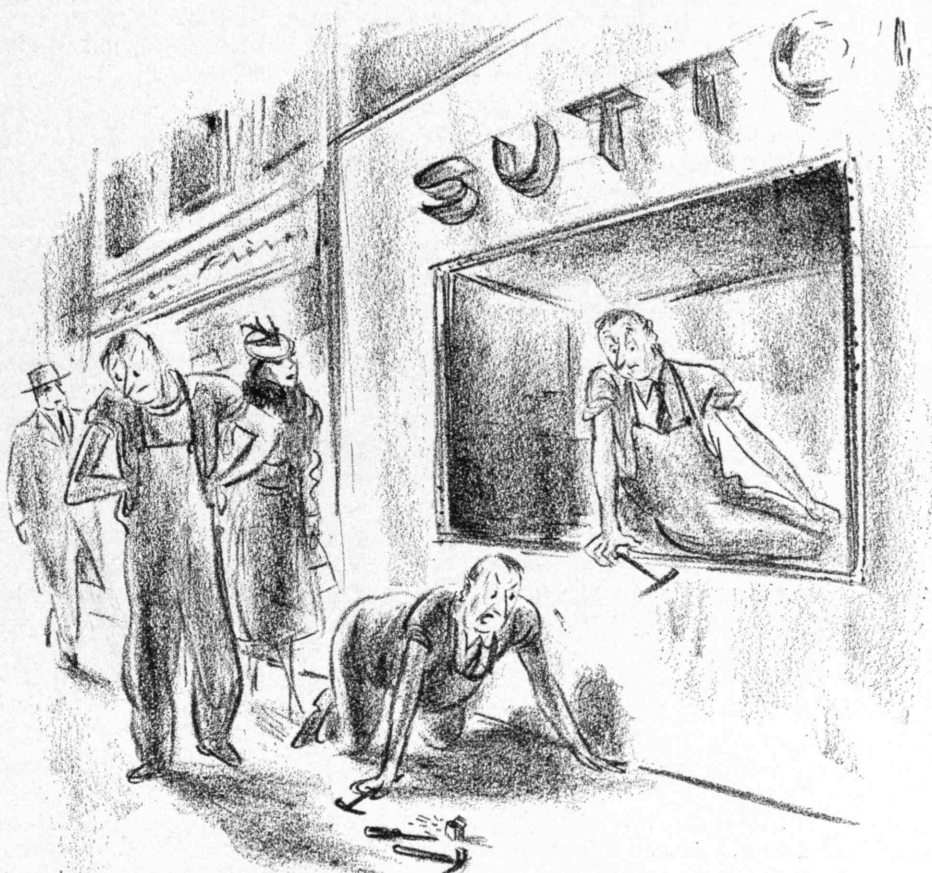
In February a survey was made of the numbers of people using the shop during a representative week. It was found that there were about 125 different users in that one week, that each worker averaged about 1.85 hours each day that he came in, and that 5.54 represented the average number of workers who used the shop between nine o'clock in the morning and five-

thirty in the afternoon. Although membership is encouraged, nonmembers are not excluded from the use of the shop.

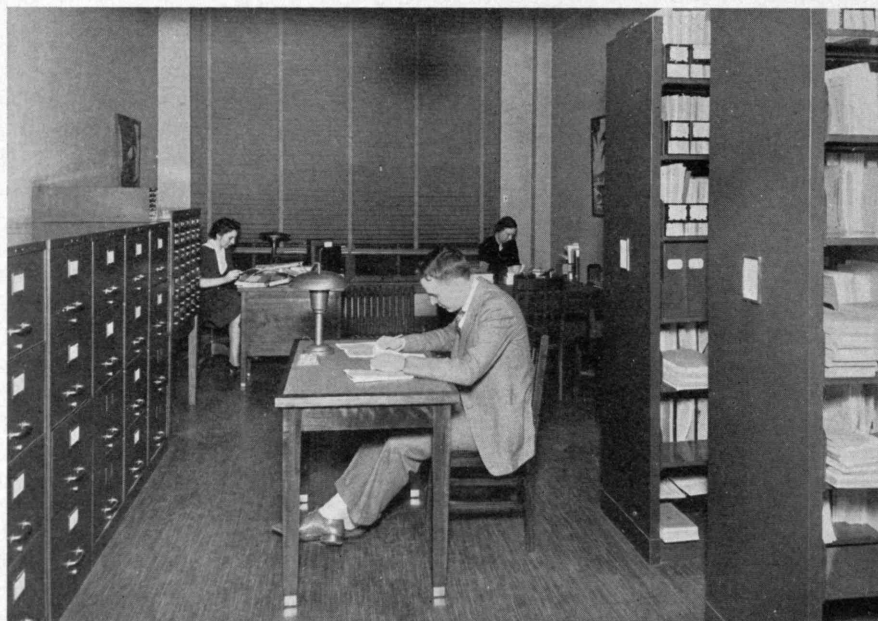
During the past year, several new machines have been added to the equipment, a photographic darkroom has been built and furnished by the students, and other facilities have been improved and repaired. The lack of funds to finance such projects does not deter these enthusiasts; they have made arrangements with several shops around the Institute to salvage any usable waste lumber and junk. Odd pieces of board may become a respectable-looking row of bins for tools, screws, and nails, or a couple of pieces of otherwise worthless pipe may show up later as the legs of a bench in the shop.

In addition to the many exhibits turned out by the men for the Technology Museum, an endless number of ingenious articles are made by the hobbyists on their own initiative. The building of miniatures seems to be a favorite hobby. Hand-sized working models of gasoline, Diesel, and airplane engines have been built by some. Other enthusiasts have built model boats, and one student built a model of an eight-oared shell, complete in every detail. Furniture, desk lamps, photographic enlargers, amplifying systems for record players, and a diving helmet were also included. One embryonic inventor conceived and built a "gadget" consisting of a battery strapped to his upper arm and wires running to a very tiny electric bulb attached to his forefinger in order to throw the desired illumination onto his paper while he was doing homework late at night.

The unseen spyglass of The Review continues to sweep the horizon for further clues in the invisible-glass mystery, further commentary thereon. Thus we are pleased, through the courtesy of the Architectural Record, to present the observations of a distracted artisan as portrayed by Alan Dunn



"Now where did I put that 'Invisible Glass' window?"



M.I.T. Photo

LIBRARY

... of the Industrial Relations Section — a clearinghouse of information on problems of industry. This special library adjoins the Dewey Library which serves the Departments of Civil Engineering, Mechanical Engineering, Naval Architecture and Marine Engineering, Economics and Social Science, and Business and Engineering Administration. Other branches of the Institute Library are similarly located near the Departments relying most upon them

To Help Students

A GRANT of \$50,000 from the Charles Hayden Foundation has made it possible for the Institute to offer special scholarship aid to high school graduates in and near Boston. Particular preference is to be given to students of the Boston English High School, according to the provisions of the grant as explained by J. Willard Hayden, President of the foundation and brother of the late Charles Hayden, '90, who was an alumnus of English High. In establishing the Hayden scholarships as a memorial to Mr. Hayden, the foundation hopes to aid capable young men whose parents are unable to finance the entire cost of their education.

Charles Hayden was a life member of the Institute's Corporation and contributed generously to Technology's endowment. When the Technology Loan Fund was created in 1930, Mr. Hayden became chairman of the loan fund committee, a position which he held until his death two years ago. Under the provisions of his will, the Institute received a bequest of \$1,000,000.

In announcing establishment of the Hayden scholarships, Dr. Compton said: "The Institute welcomes this opportunity to share in memorializing a distinguished Alumnus because the grant is so admirably expressive of Mr. Hayden's desires and because it is in line with the Institute's long-standing policy of making a Technology education available to worthy young men who might be denied a college career by lack of funds. Young men in the Boston area who are enabled to go to college by this latest benefaction of the Hayden Foundation will doubtless gain inspiration from the fact that they are following the footsteps of Mr. Charles Hayden."

The academic records, personal qualifications, and the need for financial assistance of all candidates for the Hayden scholarships will be considered in making the awards. In addition to the foregoing qualifications, all candidates must be recommended by the principals of their schools. Applicants will be required to take special examinations between May 25 and June 1 this year.

Application for the scholarships is open to graduates of high schools in the city of Boston and in the following cities and towns in metropolitan Boston: Arlington, Cambridge (High and Latin School, and Rindge Technical High School), Brookline, Chelsea, Dedham, Everett, Medford, Milton, Needham, Newton, Quincy (Quincy High School and North Quincy High School), Revere, Somerville, Watertown, Winthrop, Belmont, Braintree, Canton, Lexington, Malden, Melrose, Stoneham, Waltham, Wellesley, Weston, Weymouth, and Winchester.

Industry, Labor, and the Community

THE Industrial Relations Section of the Department of Economics and Social Science, now halfway through the second year of its existence, is busily engaged in the four main lines of activity for which it was originally established. These include the instruction of both graduate and undergraduate students in labor problems and employer-employee relations; original research in these fields; the providing of information useful to management, labor, and students, and the fostering of discussion of important problems in the field by an annual conference for executives.

In research the Section can report the completion of several minor projects and a vigorous beginning upon a larger and fundamental investigation. One of the completed studies, the more general aspects of which appeared in the *Monthly Labor Review* for January, dealt with workers' attitudes on work-sharing and layoff policies in a well-known manufacturing concern in which both the union and the management agreed to cooperate with the Section. The workers studied were employed in two unionized plants in which about one-third of the "hourly rated" working force of 7,000 was laid off in 1937-1938. Data on the attitudes of the workers toward the policy followed in making layoffs were available through a series of votes on curtailment policy which were taken under the auspices of the union.

In addition, use was made of a questionnaire distributed among selected union members and checked by extensive interviews with the union representatives in the two plants. The study indicated that in the particular situation under consideration less than one-third of the workers believed that the union alone should control layoffs. There was a widespread endorsement of work sharing and a vigorous rejection of any rigid rule for layoffs. Generally speaking, the workers believed that when layoffs are made, length of service should be given first consideration but that need and ability should also be considered and that each case should be decided on its own merits.

The investigation led to the formation of a number of questions that should be considered in assessing any particular layoff policy. The more special psychological features of the study will appear later in the *Journal of Applied Psychology*.

The Section, through two of its members, has collaborated with the United States Bureau of Labor Statistics in an exploratory study, financed by the bureau, of the "problem of the older worker," which has received so much attention since the low point of the depression. This study has attempted to avoid the emotional elements so frequently stressed in more popular articles and is considering the problem in a strictly objective way. For this purpose the records of 26 New England manufacturing concerns employing 32,000 workers were inspected to determine the age distribution of workers, the age of workers when hired and when laid off, the accident experience by age, and the productivity or efficiency of workers by age. The heart of the problem is to discover whether the older worker is actually

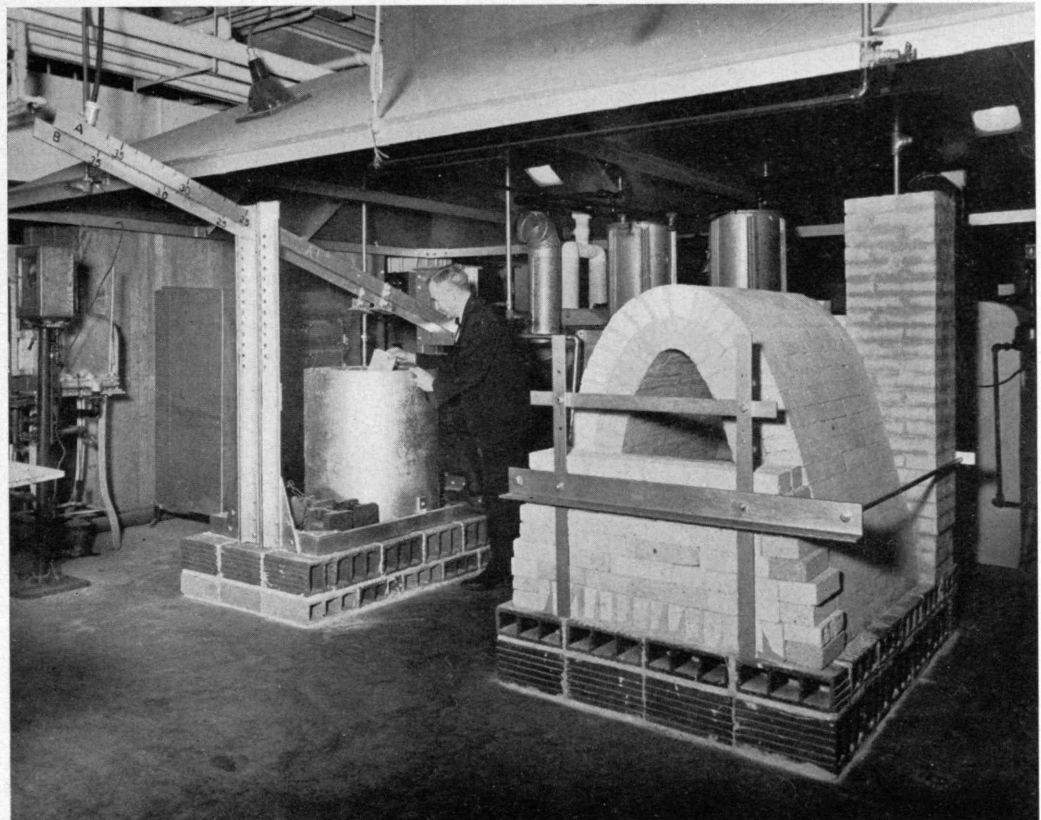
under a special handicap in getting and keeping a job. Results of this initial survey indicate that about two-thirds of the workers hired during the past year for the New England industries studied were under 35 years of age. Likewise, two-thirds of total layoffs were made in that age group. It does appear, therefore, that the older worker has a harder time getting a new job, while the younger man's difficulty comes in keeping the job that he has. No executive preference was found for hiring younger men on the grounds of greater productivity or less accident risk, but the fact that the older men become an earlier pension obligation did tip the scale in the younger worker's favor. Results of this study are not yet available for distribution.

More comprehensive than either of the above studies is an investigation just getting under way, in which all members of the staff are engaged, into the industrial relations and economic processes in a long-established New England community which is characterized by diversity of industries and racial groups rather than dominated by one type of business enterprise. This study will analyze movements of wages and employment, relations between employer and employee, and relations between the community and industry. The modern situation will be described and interpreted against a background of the industrial and labor history of the community. Local industry, community leaders, and various governmental departments have pledged the Section their fullest coöperation, thus assuring that the final results will be comprehensive and realistic.

As a center of information for management, labor, and students, the Section is functioning in several important ways. The first conference on industrial relations for

LABORATORY

A bay in the new heat-measurements laboratory. On the left, Professor Gordon B. Wilkes, '11, director of the laboratory, is preparing a hot-load machine which tests refractories under load at temperatures up to 2,800 degrees F. At the right is a gas-fired kiln, known as "the high-temperature igloo for superheated Eskimos," in which temperatures of 3,000 degrees F. are reached. The arch of this kiln is designed as a perfect catenary



M.I.T. Photo

business executives was held at the Institute in November and dealt mainly with the various aspects of collective bargaining. This conference was in a sense an experiment but was so highly successful that it will probably be made an annual affair. The Section also acts through its library as a source of information on a wide range of subjects. This type of service has increased steadily since the Section began active operation and is expected to develop further as its resources improve and its function becomes better known.

The very important teaching function of the Section has been in operation since the fall of 1937, and the Section's staff is now giving elementary and advanced work in labor problems and courses in industrial psychology. In all of this work the resources of the Section's library are drawn upon for both regular assignments and term papers on subjects of special interest. More ambitious teaching plans are now under consideration by a committee from three Institute Departments — Economics and Social Science, Business and Engineering Administration, and Biology and Public Health. The proposed program of study will adopt industrial personnel management as its central theme and will be restricted, at least for a trial period, to men coming to the Institute with industrial experience. No standard course is projected; rather, it is felt that greater usefulness will be achieved by considering individual needs. To this end the student, with Faculty advice, will be permitted to select from a wide range of possible courses those subjects best adapted to his needs and interests. Among the various disciplines which can be drawn upon are labor relations, economics, psychology, sociology, business management, industrial hygiene, and public health administration.

In After Years

AS characteristic of American colleges as the Greek-letter fraternity system are the existence and functioning of carefully organized and dynamic associations of alumni. It is perhaps a reflection of the American spirit of activity which leads the alumnus of whatever institution to go beyond mere sentimental or nostalgic interest in the college which he attended and to project the good-fellowship within his class into participation in endowment campaigns, direction of educational policy through trusteeships, betterment of student life through advisory and monetary assistance, and easing the way for new graduates through practical assistance in professional placement. Expressions of individual interest, through individual gifts and activity, are of course not unique to America; organization of big and little for group action, not through regimentation but through association, is, however, characteristically American.

In ways that differ in detail but are the same in purpose and main scope, alumni associations share in the lives of nearly all American colleges and universities. In terms of Technology, the effectiveness of the Association as a whole is expressed through the Alumni Council, whose activities, like those of the Association at large, are to serve the Institute and thus promote in turn the service which the Institute can render in education and in science and in engineering. The As-

sociation and its Council thus serve the individual Alumnus indirectly. At the same time the Council is doing many specific things for Technology.

It participates in the administration both through its overseeing of the selection of alumni term members of the Corporation and through its president, who is an ex officio member of both the Corporation and the Administrative Council. Further administrative work is done through the alumni members of Departmental Visiting Committees, two alumni representatives on each Visiting Committee being named by the Council. In other fields the Association, through its advisory councils, exercises a wise guidance over student activities. It provides an avenue for financial support to Technology by the Alumni. In many other ways the Council as a body, or its members as individuals, or the individuals of the alumni body itself deal with special problems which concern both the Association and the Institute. Older Alumni especially are most helpful in placing young men, and expansion of this assistance is very desirable. Another field of usefulness lies in the matter of admissions (see the January Review, page 130). This usefulness is not in getting more young men to come to Technology — because the limitation of enrollment now in force precludes such recruiting — but rather in directing the right kind of young men into the scientific or engineering education which the Institute offers. More can be done on this score — in counseling youngsters and assisting them in making educational choices based upon sound and objective appraisals of their powers. It is as great good to some young men to be advised against coming to Technology if their aptitudes and background so indicate, as for some others to be shown the way to enter.

Signs of Spring

WHILE the most severe blizzard in many years piled up drifts on the grounds of the Institute last month, the M.I.T. Nautical Association opened its spring Shore School on the fourth anniversary of the inauguration of this new college sport at Technology. The largest attendance ever recorded for this preparation for sailing found simultaneous schools going on at the Graduate and Senior houses, Institute classrooms, and the Margaret Cheney Room, where the coeds inaugurated a class of their own.

Growth in the sport of collegiate yachting has not been confined to the Institute alone, for this past year has seen four new names added to the roster of college sailing clubs, bringing the total to 36. The Intercollegiate Yacht Racing Association has been strengthened by the addition of Trinity College and the United States Naval Academy, bringing the membership to 11 colleges, while several applications will be acted upon this spring. The increased number of clubs wishing to take part in the Boston Dinghy Regatta has necessitated the adoption of a separate championship for the New England colleges to select their participants in this largest intercollegiate event.

Sailing at Technology started the week-end of March 25 with the first of a series of intramural races for the student championship, or Vose (*Concluded on page 282*)

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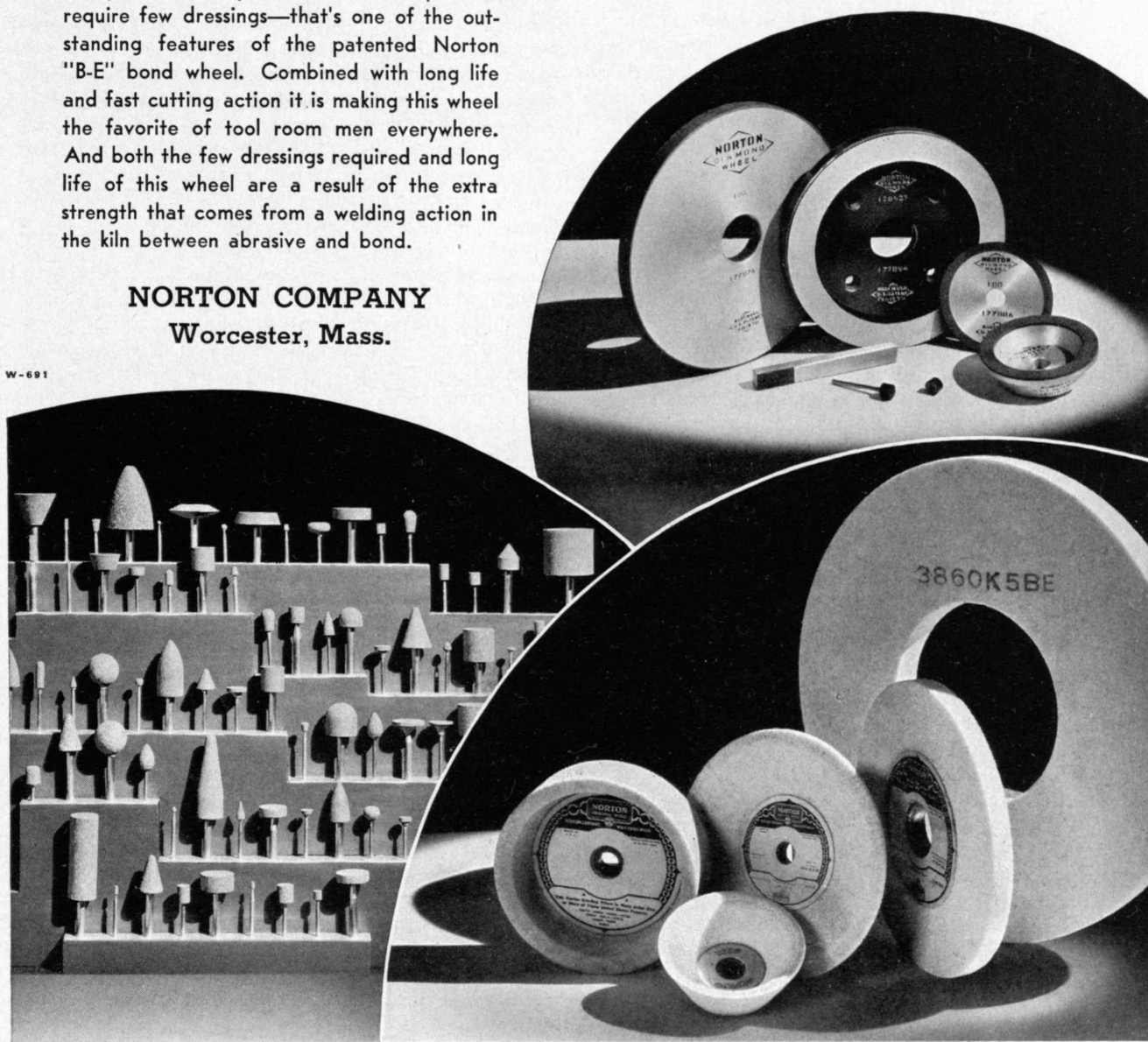
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NORTON ABRASIVES

THE TREND OF AFFAIRS

(Continued from page 250)

they are and what are their properties. Such specifications are primarily informative; after that they serve as a basis for contracts. But the case is different with soap. Everyone knows what soap is. Soap is ancient, possibly as ancient as beer.

The Babylonians had beer which they made by baking their grain into bread, then infusing the bread with water and fermenting the infusion. The product was sold in the taverns of Babylon, dispensed by barmaids. In the laws of Hammurabi it was set down that the finished beer was not to be diluted with water. If by chance it was watered, the customer was authorized to duck the barmaid in it. In passing, we note that the punishment doesn't wholly fit the crime, for the more the beer was watered, the less sticky the barmaid's bath would be. Of more significance is the consideration that the ancient law failed to state the legal content of water in beer and to specify the means by which the adulteration of the sample could be determined. Purity apparently was left to the judgment of the customer. One would suppose that the less water the beer contained, the poorer his judgment would become and the greater his disposition, unwarrantably, to duck the barmaid. This was not a very good arrangement.

In the first century after Christ, Pliny accurately described the manufacture of soap: It was made by boiling fat — preferably beef, mutton, or goat fat — with the aqueous extract of wood ashes which had been treated with quicklime. Soap seems to have been known to the ancient Gauls, and possibly the Romans learned about it from them. But the truth probably is that the detergent was used widely among the ancient peoples; it was certainly known in India at a very early date.

Wood ashes and alkaline salts were used as detergents, and soap is mentioned in the Bible. Salts of precisely the sort that is now known as alkali in the desert country of Arizona were probably of ordinary use in the households of the ancient Hebrews. They were known by the name of *nether*, a term from which the Greek and Latin *natron* and *natrum* (meaning soda) and *nitron* and *nitrum* (meaning niter or saltpeter) are derived. The Hebrew word meant alkali in the Arizonan sense; it did not mean niter. Hence the translation in the King James version of Proverbs 25:20 is wrong: "As he that taketh away a garment in cold weather, and as vinegar upon niter, so is he that singeth songs to an heavy heart." Niter does not react with vinegar, but soda effervesces. The German translator of Luther's Bible seems to have had a better knowledge of chemistry, for he translated the Hebrew *nether* by the German *Kalk*, chalk — not yet the right translation, but chalk at least fizzes when it is treated with vinegar.

The ancient Hebrews perhaps had soap, and they probably had other detergent preparations made from the same ingredients by mixing fats and oils with alkali, in the absence of water, to form salves and pomades. "For though thou wash thee with nitre, and take thee

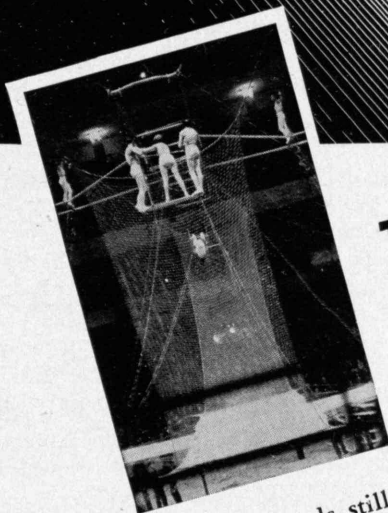
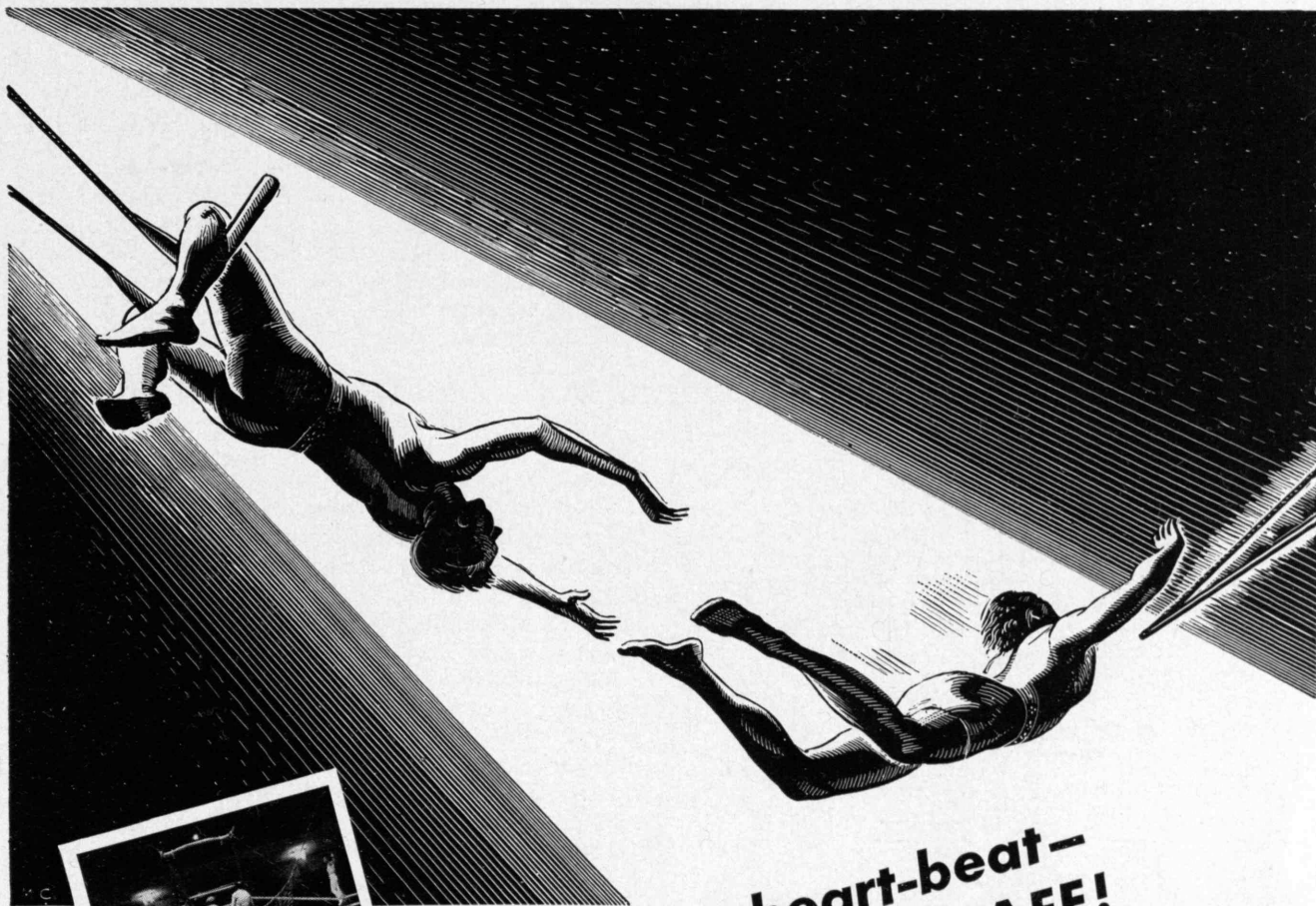
much sope, yet thine iniquity is marked before me" (Jeremiah 2:22). It is difficult to know whether soap is the right translation. However the passage makes clear that the soap was a device intended to conceal iniquity or to obliterate its evidences. It may well have been a perfumed pomade — Egyptian camouflage in the present mode of Coty and Helena Rubinstein. Ben Jonson observed: "Lady, it is to be presumed, though art's hid causes are not found, all is not sweet, all is not sound" — and suggested thereby another reason why specifications may sometimes be desirable.

Tongues and Congresses

THE English language, possibly in part because it is so flexible and so ready to make adoptions and compounds from all other languages, is the principal medium of scientific communication. German stands second in general use. Canvassing the languages in which papers are presented at international congresses of scientists and engineers provides illuminating proof of these conclusions, and at the same time affords interesting commentary on the situation of scholars.

Thus a recent writer in *Science* analyzes the linguistic mosaic of the 437 papers presented at the 16th International Congress for Physiology in Zurich last summer, finding that 211 were given in English, 143 in German, 59 in French, and 24 in Italian. Of the papers presented in German, however, only 61 came from scientific workers within the Third Reich, the rest being presented by German-speaking authors from other countries. Comparison with returns for the 13th International Congress for Physiology, held in Boston in 1929, shows the same preponderance of English and German over the other two official languages, French and Italian. At this meeting, 391 papers were in English, 106 in German, the difference of these figures from those for the 16th congress being the natural consequence of the fact that the 13th meeting was in the United States and therefore was attended by a larger number of English-speaking scientists. In 1929, however, though the total number of papers presented in German was 106 rather than 143 as in 1938, the number which came from Germany itself was the same — 61. The rest were distributed thus: ten from Hungary, nine from Russia, nine from Czechoslovakia, six from Switzerland, five from Austria, four from the Netherlands, and two from Estonia. Upon this decline in the proportion of German papers presented by scientists from Germany proper, *Science's* contributor bases the tentative conclusion that "the amount of scientific investigation (without any regard to its quality) now being done in the physiological sciences in the Third Reich is far below that produced there after the world war during the reign of democracy."

An engineering index of comparable value is to be had in a survey of the papers presented at meetings of the International Congress for Applied Mechanics. At the fifth of these, held in Cambridge last autumn, with the Institute and Harvard as hosts, 124 papers were presented. Ninety-two were in English, 18 in German, 14 in French. Of the 18 German papers, 15 were delivered by engineers from Germany proper, (Concluded on page 270)



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THE TREND OF AFFAIRS

(Concluded from page 268)

two from Poland, and one from Czechoslovakia. The wide range of usefulness of the English language is apparent from consideration of the homelands of the 92 speakers in English. Of these, 64 were from the United States, ten from England, four from Japan, three from Canada, two from Poland, and one each from Hungary, Holland, Russia, Italy, France, Turkey, Palestine, Egypt, and China. French was used by one speaker from Russia, by one from Bulgaria, and by 12 from France.

When the fourth such congress met, in Cambridge, England, in 1934, however, the comparative volume of English and German had been somewhat different. Then, 78 papers were presented in English, 29 in German; 17 of the latter were by engineers from Germany, the others including three from Poland, two from France, two from Austria, two from Russia, and one each from Czechoslovakia, Turkey, and Hungary. When one goes back to the second congress, held in Zurich, Switzerland, in 1926, one finds German speakers and the German language dominant. In that session 48 papers were presented in German — 25 of them by speakers from Germany, 11 from Switzerland, four from Austria, two from Poland, two from Sweden, and one each from England, Holland, Japan, and Czechoslovakia. Thirty speakers used French, 19 of them being Frenchmen. Only ten papers were presented in English, of which five were by speakers from the United States, four from England, and one from Japan.

A decline in the presentation in German and by Germans of material on applied mechanics is thus apparent, even when due allowance is made for the geographical factors involved. To conclude that work in this field in Germany has likewise waned is, however, hardly justified, for in quality such examples of it as have been seen continue to be in the first rank. One reason for the falling off of German exports of speakers and ideas may be found in the fact that governmental policies for the control of foreign exchange operate to prevent German scholars from traveling outside the Reich.

AIR POWER AND DIPLOMACY

(Continued from page 253)

we must be prepared for the possible use of those bases by an enemy engaged in military operations against us. The only sound preparation is the building up of our air power until such hostile operations will not even be contemplated because of the knowledge that they cannot succeed against our superior aerial strength.

The backbone of our G.H.Q. Air Force must be the bombardment airplane, and this bomber must be able to fly at least as far as the bomber of any potential enemy. Such ability would prevent an enemy from establishing itself on bases close enough to reach this country without at the same time realizing that it was subjecting those bases, and the airplanes located thereon, to potential attack by our bombers. Since the science of aeronautics is not static (Continued on page 272)

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THE TECHNOLOGY REVIEW BUREAU exists to supply authoritative information to anyone interested in details regarding the Massachusetts Institute of Technology. It serves as a clearing house for inquiry and aims to further the spread of exact information regarding entrance requirements, outline of courses, subjects of instruction and other information which may be of aid to the students considering undergraduate or graduate study at the Institute.

The Institute publishes a variety of bulletins, as well as a catalogue of general information essential to the entering student. The Technology Review Bureau will be glad to send, gratis and post free upon request, one or more copies of any publication listed below, or to forward any special inquiry to the proper authority.

Ask for the following pamphlets by their descriptive numbers

1: For general information, admission requirements, subjects of instruction, ask for Bulletin 1.

2: For announcement of courses offered in Summer Session, ask for Bulletin 2.

3: For information on courses in Architecture, both Undergraduate and Graduate, ask for Bulletin 3.

4: For a popular presentation of Educational Opportunities offered at M.I.T., ask for Bulletin 4.

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AIR POWER AND DIPLOMACY

(Continued from page 270)

and since the very near future will see the development of bombers easily capable of flying across the ocean with a load of bombs and returning to their bases nonstop, it must be obvious that this nation must parallel that development. To permit any potential enemy to equip its air force with such airplanes while we had only airplanes with a lesser range, would be similar to giving one man a club and telling him to combat another man who was armed with a revolver.

There are only two ways of giving a nation security from air attack. One is to destroy the hostile air force before it takes off, a difficult task to perform; the other is to build an air force of your own of sufficient strength to cause the enemy to refrain from attacking you because of the knowledge that it would, in turn, be subjected to a similar attack of equal, or greater, magnitude. The peace-loving nations of the world are not responsible for this unfortunate condition; their only responsibility is to be certain that they so equip themselves as to be sure that their institutions and forms of government will continue to exist until the law of might is superseded by the law of reason and common sense. The possession by this nation of an air force powerful in bombardment aviation, for instance, constitutes a threat to no one. On the other hand, it does constitute the only means by which we can guarantee security to this nation from attacks via the air.

After the air-force planes are in the air, there is no defense against an air attack on a grand scale. Pursuit, or defensive, aviation and antiaircraft artillery may cause casualties (they will undoubtedly cause the attacker to adopt certain tactics that will reduce the effectiveness of his attack), but it is accepted as a cardinal principle that a powerful air attack, once launched, cannot be stopped. When the purpose of the G.H.Q. Air Force is understood, it then becomes apparent why we contend that our nation's strength in air power—that is, its ability to deliver a blow from the air—can be measured in the number of long-range bombers that are assigned to the air force.

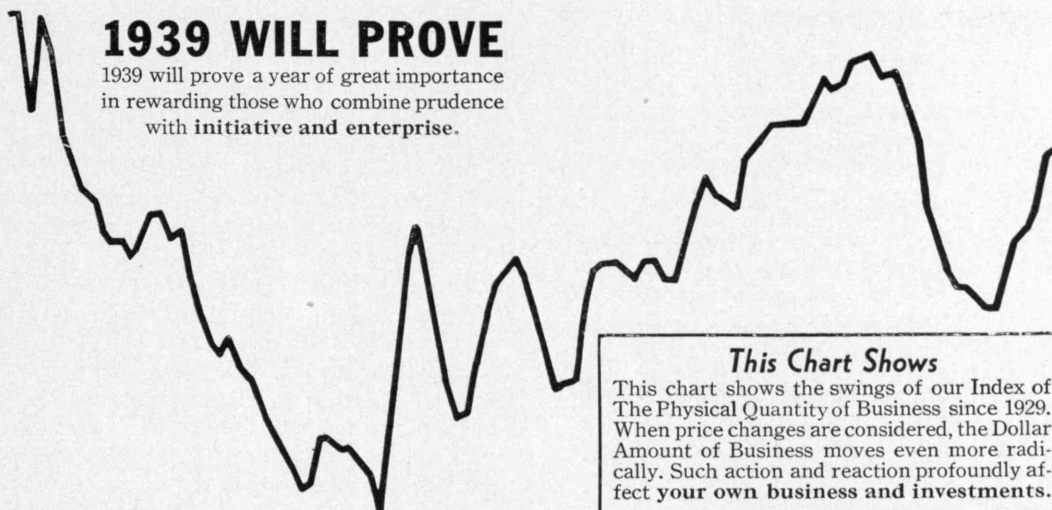
The object of wars in the past could not be realized until one country or the other, by overcoming the opposing army and navy, brought pressure, or threatened to bring pressure, against the economic and social structure of the country and thus enforced its own will by destroying the enemy's will to resist. The more civilized a country is, the more highly developed and complex is its economic and social structure and the quicker it can be brought to terms once pressure is brought to bear directly against this structure. The very complexity of modern civilization makes us extremely vulnerable to attack from the air.

In the words of Major General Frank M. Andrews, who in February completed four years as commanding general, G.H.Q. Air Force, and who is in a better position than any one else in the country to be familiar with our air force and its needs:

The G.H.Q. Air Force, the entire army combat air force in continental United States, numbers today but slightly over 400 fighting planes. In another six (Concluded on page 274)

1939 WILL PROVE

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To gather these facts, statistically classified, a complete organization is required with a background of long personal experience and data continuously compiled from widespread sources. Even if you had all such statistics in your office, the mere clerical expense of sorting them and typing them for your perusal might well exceed the moderate cost of a thoroughly competent Service.

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AIR POWER AND DIPLOMACY

(Concluded from page 272)

months, with delivery of planes now on order, this number will be increased to approximately 630. However, sufficient personnel are not now available in the G.H.Q. Air Force to man these 630 planes.

We have now, as part of our 400 combat planes, 12 long-range bombers, familiarly known as "flying fortresses." Some 39 more are on order. Today, as far as we know, these planes are the best long-range bombers in existence in the world. We should have many more of them.

Our air force must be built around long-range bombers. The ability to reach far from our shores and strike an enemy before he can come within his effective range, should constitute the very foundation of our air defense policy. Once a powerful air force leaves its base, though it may suffer losses, it cannot be stopped by any man-made weapons. Common sense dictates that we prevent such an enemy force from starting. To do this requires numbers of long-range air-force bombers.

Regardless of how much we would like to prevent it, our ocean bulwarks are shrinking rapidly. Aeronautical development will make of the Atlantic Ocean an English Channel. When that time arrives — and the world is on the threshold of that period — the problem of making America impregnable in the air assumes a more serious aspect than that presented today.

America, therefore, has two problems, the one for "today," and the one for "tomorrow." Today's problem involves the establishment of a sphere of air influence around the Western Hemisphere. Tomorrow's problem . . . involves security against air attack initiated from bases across the oceans. Our country should be the first to span the ocean both ways, non-stop.

The seriousness of the situation is brought home when it is remembered that flying the Atlantic both ways non-stop is possible today. Flying it one way with a load of bombs and returning without them is definitely possible tomorrow. Many of the large airplane companies in this country today will be glad to contract to build bombers with a tactical range of 10,000 miles. If we can do so, other countries can and will. In fact we have no proof that they are not already doing so.

Security cannot be obtained behind the bastions of idealism. Idealism itself requires security. The nations that are great today have achieved that greatness because of their ability to keep the aggressor from their soil. In the past, armies and navies provided the instrumentalities to accomplish that purpose. Today, without air power, national security in a war between major nations is impossible. Air power may not keep America out of war but, if it is adequate, it will keep war out of America.

BLENDS OF NOBILITY

(Continued from page 256)

instead of chlorides are employed, this composition pits more readily than ordinary 18:8 without molybdenum. Lest the reader get a false impression, it should be emphasized that no metal or alloy is corrosion resistant in all mediums; even the noblest metal will fail eventually in some fashion in the wrong environment.

As a subject for research this group of alloys offers fruitful possibilities to the *(Continued on page 276)*

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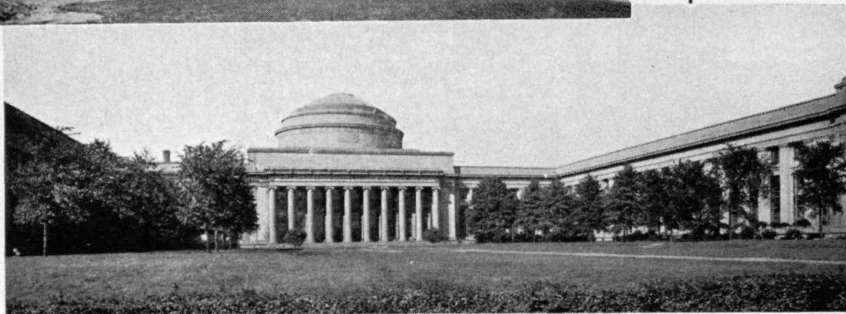
BLEND S OF NOBILITY

(Continued from page 274)

student of corrosion. It permits him to study the three major types of corrosion phenomena, by one or more of which all our useful metals return to the compounds from which they were originally won. It further requires studies of the nature of passivity of alloys, on which little work has been done in the past. Since composition, heat treatment, mechanical working, and surface finish are all factors which must be considered, the student of corrosion, in his travels from the interior of a metal outward across the boundary to the gaseous or liquid corrodent, must put on the physicist's, the chemist's, or the metallurgist's spectacles whenever necessary. Obviously this is impossible for one man: Coöperative work among professionals from each of these fields, as well as from engineering and industry, is necessary. With this requisite in mind, President Compton, some four years ago, set up a committee to supervise research work in this field at the Institute. Dr. Robert S. Williams, '02, sometime member of the Department of Chemistry and now Head of the Department of Metallurgy, heads the committee. The other members come from the Departments of Mechanical and Chemical Engineering, as well as from Physics and Metallurgy. The laboratory staff under the direction of Dr. Herbert H. Uhlig, '32, a physical chemist, has done such diversified work as practical service tests in harbors, as well as extremely fine surface studies.

Although aided originally by financial support from the Chemical Foundation, the committee is continuing with but Institute help. The objectives of the committee and its staff are practical in the extreme. Primarily they concern studies which will permit the lessening of corrosion of existent alloy compositions, and the search for others which are more corrosion resistant. To achieve such ends, the disease must be correctly diagnosed. All the tools of the physicist, chemist, and metallurgist are being employed. This is one aspect of the program; along with it, parallel researches are being conducted in the laboratory and afield on the initiation and the progress of corrosion of commercial alloys, as well as the same or new ones made in the laboratory.

Briefly stated the latter work has clearly demonstrated: (1) that 18:8 containing molybdenum is highly resistant to pitting in chloride solutions but not in bromide solutions; (2) that ordinary 18:8 annealed *in vacuo* at high temperatures is likewise highly resistant to pitting; and (3) that such alloys containing less than .02 per cent carbon when melted *in vacuo* are more ductile than ordinary compositions and when melted in a nitrogen atmosphere are extremely resistant to corrosion. In regard to the diagnosis of the disease, a fairly complete picture has been evolved. For lack of space it may be stated simply that the high corrosion resistance of the alloys studied is attributed not to the presence of a true oxide film but to the particular electronic structure of the metals composing the alloy. Such a structure is, from the theory evolved, possible only for a definite minimum (Continued on page 278)



The top picture shows the Great Court as it looked when Frost & Higgins began operations in 1928. The lower photograph shows the Court as it appeared in 1937, with the trees in place and growing sturdily.

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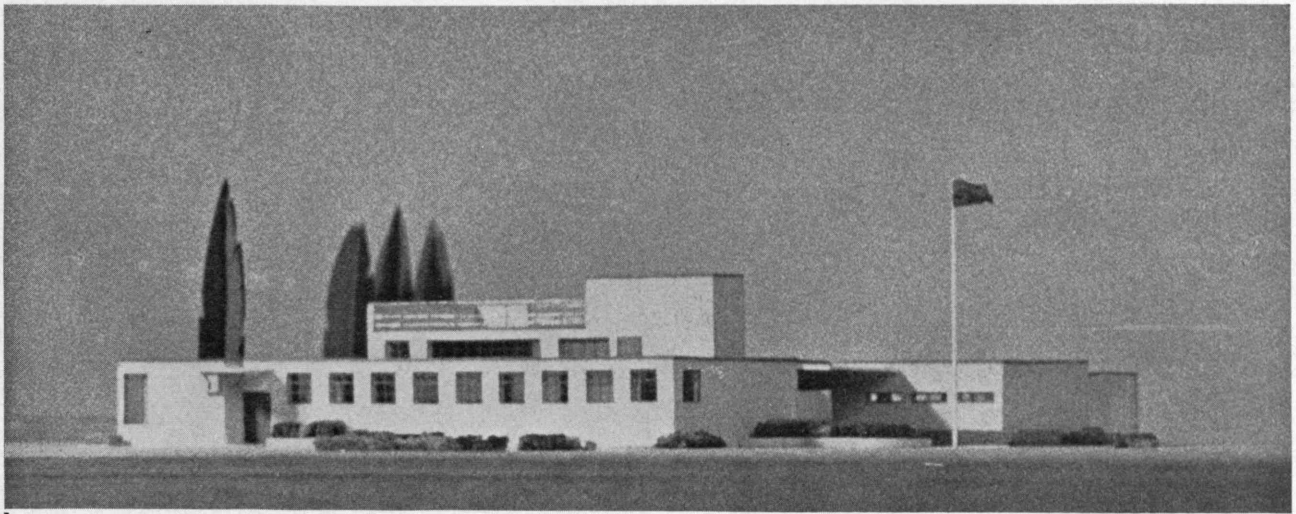
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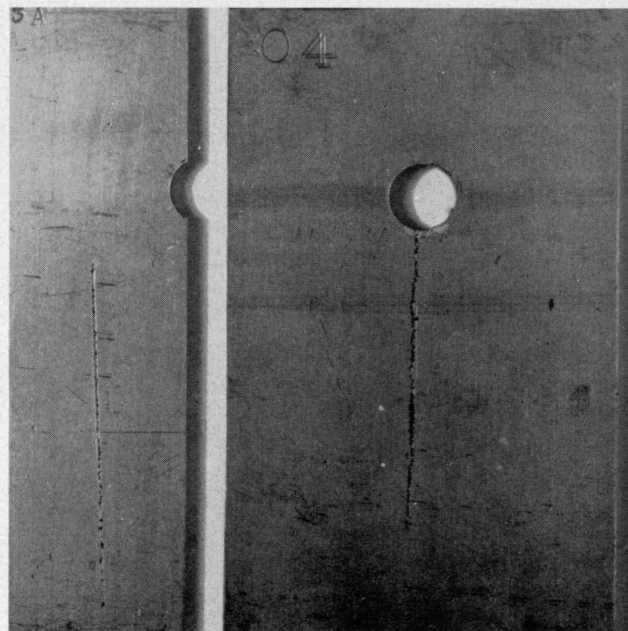


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BLENDS OF NOBILITY

(Continued from page 276)



Influence of corrosion products in accelerating attack. The specimen of nickel-chromium-iron alloy at the right was immersed in the sea water of Boston Harbor for one year. A pit began at the point of suspension (a bakelite rod through the hole) and progressed in the direction of gravity. The specimen at the left was immersed in a solution of ferric chloride in the laboratory, and a tiny stream of a ferrous chloride (corresponding to the natural corrosion products) was permitted to flow downward against it. The pit groove was photographed after four hours. In both, the electrochemical action which causes local corrosion serves to protect the remainder of the surfaces from attack

composition of the passive constituent. Thus at least 14 per cent of chromium must be added to iron to achieve a passive composition; in other words, one chromium atom is capable of passivating five iron atoms. This is in accord with experiment, and the rules found not only hold for other well-known passive alloys but permit the prediction of new corrosion-resistant alloys. To return for a moment to iron-chromium alloys, it may be said that, when these are immersed in saline mediums, pitting may begin at places on the surface such as in voids, inclusions, grain boundaries, checks, or cracks where a decreasing chromium-concentration gradient may occur. The experiments of Dr. Uhlig and his co-workers show that once corrosion has started, the corrosion products and differential oxygen concentration at the pit may accelerate further attack. Where many pits are simultaneously formed, as at the grain boundaries of improperly annealed 18:8, local corrosion may result in the collapse of the material. When, however, the pits are scattered uniformly over the surface of the metal, attack is usually extremely slow. This has, of course, suggested the production of stainless alloys of the 18:8 variety on which many pits may simultaneously originate in saline mediums, though no one of them will proceed far enough to cause the failure of the metal. Part of this work has been published in condensed form by the Chemical Foundation and much of it will appear soon in standard journals. (Concluded on page 280)

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BLENDS OF NOBILITY

(Concluded from page 278)

Work on corrosion is not new at the Institute, for staff and students have in the past published excellent reports on the subject. But the establishment of the corrosion laboratory at Technology as a coöperative interdepartmental effort is regarded as unique to American academic institutions. Since the initiation of the laboratory, a good number of candidates for undergraduate and graduate degrees have found practical help and supervision from the committee and the staff. Likewise the committee has worked with various organizations, such as the Army and Navy, to whom corrosion problems are of vital importance. Such coöperation with government and industry is essential if we are to combat this archdemon of waste — corrosion.

FROM THE MOUNTAINTOPS

(Continued from page 258)

waves travel in straight lines, like the longer waves, but unlike the longer waves they are not reflected from the upper atmosphere. Consequently, when the short waves encounter the horizon, they glance off the surface of the earth and are lost. To cover a wide territory with such ultrashort waves, therefore, it is necessary that the horizon be remote from the transmitter, and remote horizons come only with height. From the top of Mount Washington, a line-of-sight view into five states is available, including not only some of the wealthiest smaller cities in the country but also great stretches of rural regions which never have had good radio service. Mount Asnebumskit, closer to great population centers, has not so wide a radius, but it can be expected to serve a circle 200 miles across. This coverage, in apparent contradiction to the distance limitation, is wider than the horizon from the mountaintop. But frequency mod-

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ulation has to some extent circumvented the limited range of ultrashort waves by sending out a signal which can be utilized, even though it consists only of the remnants of a wave which have bent around the bulge of the earth by the laws of refraction.

Sure that he had found the answer to radio's sorest ailment — static and noise — and sure that his system could operate completely free of the "accepted" distortion, Major Armstrong set out to convince the radio industry. He met with a resistance unusual in an age only too willing to believe anything of science, especially in its more familiar though less generally understood applications. In the first place, the prior dictum of not a few experts made for skepticism. Then, in the face of demonstrations, engineers attributed the improvement to the use of the ultrashort waves. (It is true that some of the improvement, with respect to natural "summer" static, does arise from the difference in wavelength — as is freely acknowledged — but even on the same wavelength, frequency modulation can introduce an improvement over amplitude modulation represented by a power increase of 2,500 to one.) Finally, resistance appeared in the most potent guise of all — the economic, a factor which naturally enough takes on more and more significance from the complex pattern of interrelationships characteristic of a highly technological civilization. Was it — is it now — possible to expect that the billions invested in the conventional amplitude-modulation system (thirty million receivers and over 700 broadcast stations) can be displaced by a system which has advantages but which has the fatal disadvantage of non-adaptability to the present setup? This question had to be decided. The councils met and decided that the answer was no. So Major Armstrong, like many an inventor before him, took his improvements unto himself and considered the foolishness of men.

The next step was a bold one: He applied to the Federal Communications Commission for an experimental license to erect a frequency-modulation station of power commensurate with high-powered conventional broadcast stations. After assuring the F.C.C. that he had no intention of obtaining outside financial assistance in erecting the station, he obtained the construction permit. Thereupon, from his office as professor of electrical engineering at Columbia University, he laid down the complete plans for Station W2XMN — the first high-powered frequency-modulation station extant. Then, at a cost of some \$250,000 he proceeded to erect the station on the Palisades, at Alpine, N. J. The station has been in operation for a matter of only six months, but its fame has spread far and wide. With the aid of C. R. Runyon, an amateur operator in Yonkers, N. Y., Major Armstrong has been busy giving demonstrations to the chief engineers (and to many of the bosses of the chief engineers) of the radio industry. All go away convinced.

One of the first men to break with the seeming do-nothing policy of the industry was John Shepard, 3d, whose Yankee Network in New England commands the respect of the rest of the broadcasters as a successful, well-operated chain. Mr. Shepard heeded the word of his chief engineer, Paul A. DeMars, '17, came to Alpine to see the transmitter, and traveled 70 miles out on Long Island to hear the results at a convincing distance. One hearing was enough. Today John Shepard has commandeered two mountaintops for frequency-modulation stations, and with Major Armstrong's assistance is readying them as rapidly as possible to take the programs of his network. His is partly an esthetic venture — he wants better radio — but for most part it is a hard-headed matter of reaching more New Englanders with a more acceptable signal, which will redound definitely to the profit of all. (Concluded on page 282)

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FROM THE MOUNTAINTOPS

(Concluded from page 281)

Before success is at hand, these New Englanders must have the special type of receiver required to interpret the frequency swings of the transmitters. The General Electric Company, convinced of the virtue of the system at about the same time as Mr. Shepard, has constructed receivers for Major Armstrong. From this experience it appears that a receiver capable of receiving either the new system or the conventional stations can be marketed for a price in the neighborhood of \$100. The superb quality of which the system is capable would necessitate a larger, more expensive receiver than this, but the cost is not excessive in any event.

Meanwhile the councils are beginning to reconvene and to consider whether the tocsin tinkles or booms.

THE INSTITUTE GAZETTE

(Concluded from page 266)

Cup. These will run until the end of the term. The first large event, on April 29, will bring 11 colleges to the Charles to race for the Intercollegiate Championship and the Henry A. Morss Trophy now held by the Technology sailors. May 7 will see the Technology coeds as hostesses to several women's institutions, including Vassar, Pembroke, Katharine Gibbs, and probably Radcliffe and Sargent.

The largest intercollegiate event will be the Boston Dinghy Regatta in which the leading crews from the New England championships will meet colleges from the more distant parts of the country. As in former years, the size of this event is limited only by the 40 Tech-Herreshoff boats which make up most of Technology's flotilla of 46 craft.

An innovation this spring will be a dual meet sailed during spring recess, with the United States Military Academy at Annapolis, in the middies' new fleet of 14-foot International Class dinghies. These boats are larger than the Technology dinghies and carry genoa, or overlapping, jibs. Technology sailors proved their ability in this type of boat by winning the Canadian-American Dinghy Championships at Kingston, Ontario, last fall. The sailors at Annapolis show their sportsmanship by sailing their first race in their new boats against our crews which have demonstrated their ability in this class. Technology sailors are looking forward to the time when they have one or two of these boats on the racks of the Sailing Pavilion so their crews may become familiar with their more intricate rigging and sails.




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A L U M N I ' D A Y



WHEN GOOD FELLOWS GET TOGETHER

JUNE 2, 3, 4, *and earlier*

REUNIONS — from '89 to '34 and all the 4's and 9's between, it's their year. There's something about a reunion, in fact several things. They don't need listing because any prospective reunioner can think up more reasons why HE has to go than any committee ever could. Reunions are like that. . . . But even if you're not a '4 or a '9 man, or yet a member of Course XV, which celebrates its 25th Anniversary on June 4, you can join the group on

JUNE 5, ALUMNI DAY

— a day packed with color and variety. In the morning the conference on the Technology of National Defense, a tremendously significant and timely subject with an impressive list of speakers. . . . At noon the luncheon in Du Pont Court, where Alumni, wives, and guests will meet and eat. . . . Then there will be the exhibits, showing industry's part in national defense. . . . In the afternoon, of course, the Class Exercises, with '39, '14, and '89 sharing the honors. . . . Then in the evening, high spot of the day, the Annual Alumni Banquet, an affair long to be remembered. No speeches, plenty of fun and gaiety, and a custom which was begun last year with such success, the Stein-on-the-Table, a lasting souvenir of this memorable evening. . . . That's about enough for one day, and that's the official end of Alumni Day, but

JUNE 6 *is* COMMENCEMENT DAY

with the Graduation Exercises at Symphony Hall, followed by a reception to the Graduating Class and Alumni at Walker Memorial. . . . And finally don't forget *this* fact: The total cost of admission to all official events, obviously not including class reunions, is

Only \$5.00

J U N E ' 5 ' 1 9 3 9

COMPARATIVE SCHOLASTIC STANDINGS OF FRATERNITY AND DORMITORY UNDERGRADUATE GROUPS AT M.I.T.
(as of end of First Term, 1938-39)

<i>Comparative Standing (based on February '39 ratings)</i>	<i>Increase over June '38</i>	<i>Increase over Feb. '38</i>
Fraternity Seniors.....3.42	*0.04	0.06
Dormitory Seniors.....3.54	*0.01	0.14
Fraternity Juniors.....3.26	0.03	0.06
Dormitory Juniors.....3.36	*0.08	0.03
Fraternity Sophomores.....3.13	*0.13	*0.08
Dormitory Sophomores.....3.32	0.17	0.14
Fraternity Freshmen.....2.94	*0.10	0.08
Dormitory Freshmen.....3.15	*0.09	0.00
General Average.....3.17 (Fraternity)	*0.07	0.02
General Average.....3.34 (Dormitory)	0.00	0.08

FRATERNITY SCHOLASTIC STANDINGS

<i>Comparative Standing of 23 Chapters (based on February '39 ratings)</i>	<i>Increase over June '38</i>	<i>Increase over Feb. '38</i>	<i>Comparative Standing of 23 Chapters over previous five-year period</i>	<i>Comparative Standing of Freshmen of 23 Chapters</i>	<i>Rating Feb. '39</i>	<i>Comparison with Chapter Rating</i>
1. Phi Beta Delta.....3.48	*0.14	*0.03	1. Phi Beta Delta	1. Theta Delta Chi.....3.41		+0.05
2. Kappa Sigma.....3.46	0.19	0.24	2. Theta Delta Chi	2. Phi Gamma Delta.....3.32		-0.047
3. Alpha Tau Omega.....3.368	0.148	0.128	3. Chi Phi	3. Kappa Sigma.....3.30		-0.16
4. Phi Gamma Delta.....3.367	*0.053	0.053	4. Sigma Alpha Mu	4. Phi Kappa Sigma.....3.22		-0.12
5. Theta Delta Chi.....3.36	0.03	0.27	5. Phi Delta Theta	5. Alpha Tau Omega.....3.21		-0.158
6. Phi Kappa Sigma.....3.34	0.083	0.18	6. Kappa Sigma	6. Chi Phi.....3.17		-0.04
GENERAL AVERAGE ALL UNDERGRADUATES.....3.24	*0.07	0.04				
7. Sigma Nu.....3.232	0.432	0.162	7. Phi Mu Delta	7. Beta Theta Pi.....3.16		-0.07
8. Beta Theta Pi.....3.23	*0.148	0.02	8. Beta Theta Pi	8. Phi Mu Delta.....3.13		-0.05
9. Theta Chi.....3.22	0.43	0.39	9. Phi Kappa Sigma	9. Sigma Alpha Mu.....3.105		-0.035
10. Sigma Chi.....3.20	0.23	0.41	10. Phi Gamma Delta	10. Sigma Chi.....3.104		-0.096
11. Phi Mu Delta.....3.18	0.01	0.14	11. Delta Upsilon	11. Sigma Nu.....3.09		-0.142
12. Chi Phi.....3.174	*0.086	*0.139	12. Delta Psi	12. Theta Chi.....3.04		-0.18
				GENERAL AVERAGE ALL FRESHMEN.....3.03		
13. Delta Psi.....3.17	*0.177	*0.03	13. Delta Tau Delta	13. Delta Psi.....3.02		-0.15
AVERAGE ALL FRATERNITY MEN.....3.17	*0.07	0.02				
14. Sigma Alpha Mu.....3.14	*0.32	*0.09	14. Sigma Alpha Epsilon	14. Phi Beta Epsilon.....2.98		-0.11
15. Phi Beta Epsilon.....3.09	*0.01	*0.24	15. Phi Sigma Kappa	15. Phi Beta Delta.....2.97		-0.51
				GENERAL AVERAGE FRATERNITY FRESHMEN.....2.94		
16. Sigma Alpha Epsilon...3.08	*0.265	0.105	16. Phi Beta Epsilon	16. Delta Tau Delta.....2.88		-0.10
17. Phi Sigma Kappa.....3.077	*0.18	*0.183	17. Sigma Chi	17. Lambda Chi Alpha.....2.80		-0.16
18. Phi Delta Theta.....2.992	*0.368	*0.258	18. Sigma Nu	18. Sigma Alpha Epsilon.....2.69		-0.39
19. Delta Upsilon.....2.991	*0.349	*0.299	19. Alpha Tau Omega	19. Phi Sigma Kappa.....2.56		-0.517
20. Delta Tau Delta.....2.98	*0.11	*0.08	20. Theta Xi	20. Delta Upsilon.....2.55		-0.441
21. Lambda Chi Alpha....2.96	0.03	*0.22	21. Delta Kappa Epsilon	21. Phi Delta Theta.....2.54		-0.452
22. Delta Kappa Epsilon...2.89	*0.31	*0.09	22. Lambda Chi Alpha	22. Delta Kappa Epsilon.....2.45		-0.44
23. Theta Xi.....2.66	*0.71	*0.72	23. Theta Chi	23. Theta Xi.....2.15		-0.51

*Decrease

TECHNOLOGY MEN IN ACTION

CHECK LIST OF THE ACTIVITIES AND ACHIEVEMENTS OF M.I.T. ALUMNI, OFFICERS, AND STUDENTS

Worth Noting

¶ That LOUIS S. CATES '02, whose winning of the William Lawrence Saunders Medal we announced in December, has been named a chevalier of the Legion of Honor in France.

¶ That in the American National Theater and Academy's competition for a design for a model community theater and fine arts center third-prize winner was EDWARD D. STONE '27. Honorable mention was achieved by WILL R. AMON '22, BISSELL ALDERMAN '35, and WILLIAM E. HARTMANN '37. LAWRENCE B. ANDERSON '30 was a member of the jury of awards.

¶ That DOUGLAS M. STEWART '33 was presented with the Collingswood Prize for Junior Engineers from the American Society of Civil Engineers. This was for his paper, "Behavior of Stationary Wire Ropes in Tension and Bending."

Written

¶ By WILLIAM D. COOLIDGE '96, "Elihu Thomson's Interest in Research," presented at the Thomson commemoration held in Philadelphia on February 16; printed in *Science*, March 3. DR. COMPTON's contribution to this meeting, "Elihu Thomson the Scientist," appears in the same issue of *Science*.

¶ By LANGDON PEARSE '01, as editor, "Modern Sewage Disposal," the anniversary volume of the Federation of Sewage Works Associations. Of the 33 contributors listed in the table of contents, 12 are Tech men: ROBERT S. WESTON '94, CHARLES G. HYDE '96, CHARLES-EDWARD A. WINSLOW '98, EARLE B. PHELPS '99, LANGDON PEARSE '01, CHARLES A. EMERSON, JR., '05, SAMUEL A. GREELEY '06, CHARLES A. HOLMQUIST '06 (with C. C. Agar), HAROLD W. STREETER '07, HAROLD E. BABBITT '11, WILLIAM C. PURDY '13, and GORDON M. FAIR '16.

¶ By WILLIAM M. VERMILYE '01, "Human Understanding in Industry," a pamphlet issued by the National City Bank of New York, which contains material originally presented before the department of economics and social institutions of Princeton University in January.

¶ By NORMAN L. BOWEN '12, "Geology and Chemistry," an article, *Science*, February 17.

¶ By THOMAS R. CAMP '25, "Lateral Spillway Channels," a technical paper, *Proceedings*, American Society of Civil Engineers, February.

¶ By WILLIAM E. YELLAND '30, "Effect of Size and Size Application on the Properties of Continuous Filament Viscose Rayon," an article well illustrated with statistics and graphs, *Textile Research*, March.

¶ By the editorial staff of *Business Week* with the assistance of DONALD G. FINK '33, "1939 — Television Year," a report to executives, December 31.

¶ By BEVERLY DUDLEY '35, "Recent Television Developments in the United States," an article, *Phi Mu Delta Triangle*, November. Mr. Dudley is to be managing editor of the new McGraw-Hill publication, *Photo Technique*, to appear in May.

¶ By KARL T. COMPTON, President, "College Plans and Systems," delivered as an address at the installation of EDWIN S. BURDELL '20 as director of Cooper Union; printed, *School and Society*, November 12.

¶ By NORBERT WIENER, Staff, and BROCKWAY McMILLAN '36, "A New Method in Statistical Mechanics," presented before the American Mathematical Society, February.

Talks

¶ By JOHN W. BARRIGER, 3d, '21, "Romance of Railroad Finance," before the 1939 Transportation Symposium of the Franklin Institute on February 7. Other official M.I.T. delegates were CHARLES E. SMITH '00 and JOHN B. BABCOCK, 3d, '10.

¶ By MORRIS H. KLEGERMAN '28, "The Nontechnical Side of the Engineer's Work," before civil engineering students at Lehigh University on February 23.

Quotations

¶ "While the seasonal trend and the yearly change of models in the automotive industry increase the problems in the way of what can be done to stabilize employment, real improvement has been effected over a period of time. The hours of work have been spread more evenly throughout the year." — ALFRED P. SLOAN, JR., '95.

¶ "Under the inspiration of a free competitive system, modern business steadily improves the products which it sells to the public and, in one way or another, constantly decreases the cost of those products to the public. Nowhere in the world is there a people so consistently well served." — PAUL W. LITCHFIELD '96.

¶ "It is easy to lose sight of the cardinal principle which is the secret of the patent's power. This is the concept that a patent is, for a time, private property, just as land, a home, or personal possessions are private property." — FRANK B. JEWETT '03.

¶ "Individual initiative and responsibility are essential to the American way of doing things, not only in business but also in the work of helping the fellow who is down on his luck." — ALFRED H. SCHOELLKOPF '15.

¶ "Parking is an engineering question. I believe the problem could be solved by procuring legislation to make certain streets and facilities . . . now free, into toll facilities. . . . This revenue should be used to subsidize private corporations to provide parking garages." — WALTER D. BINGER '16.

DEATHS

* Mentioned in class notes.

¶ GEORGE F. QUINBY '77, February 13.

¶ FREDERICK WALSH '81, February 4.

¶ FREDERIC S. BOUTWELL '89, February 16.

¶ GEORGE HOOPER '91, February 9.

¶ JAMES HUMPHREYS '95, February 16.

¶ WILLIAM M. PERLEY '98, February 4.*

¶ WILLIAM ANGUS '00, October 8.*

¶ HUSE T. BLANCHARD '01, November 4.*

¶ ERNEST L. CLIFFORD '04, February 7.*

¶ ANDREW J. SMITH '18, February 11.

¶ ROBERT GUYER '22, January 14.*

¶ JAMES H. HOOKS '25, July 28.

¶ JOHN A. HARRISON '35, October 28.

¶ HENRY E. ANDREWS, Former Staff, February 10.

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

M.I.T. Club of Akron

We started off the year with a rousing meeting on January 31 at the University Club. After a dinner of rare roast beef, a short business meeting was held. A luncheon with visiting Alumni attending the American Institute of Chemical Engineers convention was discussed sharply by Course II men, but the clear heads of the Course X men decided the issue with eight votes to spare. Therefore, we extend here a welcome to Alumni visiting the A. I. Ch.E. convention in Akron, May 15, 16, and 17, to have lunch with us. Maybe you will see someone who owes you ten bucks from the days that you spent on the banks of the Charles. Maybe you will see someone you owe ten bucks. Stay away only in these extenuating circumstances.

As speaker of the evening, we were fortunate in obtaining a medical man of national repute to talk to us on the "Social Trends of Medicine." Dr. Harlan Trumbull, director of research of the B. F. Goodrich Company, was present to introduce Dr. R. G. Pearce, founder of the famous Akron Clinic. Dr. Pearce started his speech with a reference to the days that he spent with W. K. Lewis '05 during the World War period, when they were engaged in a research program concerning gas masks. Dr. Pearce told us that he, a medical man, had received more inspiration from this association with our great engineer than from all of his time in medical education. Your reporter might tell even more, but knowing Dr. Lewis as he does, he fears the time that a voice, accompanied by a great Lewisian snort, will say, "Young man, what's this bull you printed about me?"

Then followed one of the eloquent and scholarly orations of the decade. It might better be called "A Medical Man Examines Himself and His Profession" rather than "Social Trends of Medicine," for the speaker profoundly laid before us the shortcomings of himself and his profession as far as it concerned us. He told of medical systems of other nations, and what the future of medical service was to be here in the United States. If steps were not taken immediately, the enormous present pressure would push medicine into a state-controlled affair. A happy future lies in cooperative medicine, wherein groups are formed and they detail certain physicians to serve them. In this manner, the choice of physician is maintained, something impossible under state medicine. Dr. Pearce spoke for an hour and a half and graciously stood another hour of questions. — JOHN T. COX, JR., '36, *Secretary*, 76 Corson Avenue, Akron, Ohio.

M.I.T. Association of Buffalo

On Monday, January 30, the day of our meeting, Mr. Bell of Bell Aircraft called to say that he had refused several other activities for that evening, including the annual chamber of commerce meeting, to come to our gathering but that he had just been called to Washington in regard to our national aviation program. He had good news to offset the bad news in that he had a very capable man to take his place — an M.I.T. graduate, an Army-trained pilot, and the project engineer of the Bell Aircraft Corporation: Jack Strickler '32. That same day Buffalo was hit by the worst snowstorm of the year, paralyzing traffic considerably. It took me an hour and a half to get out of our company parking lot because the cars had been snowed in. Shortly after seven o'clock we started the meeting with a total of 32 present.

We had a brief business meeting including election of new officers: President, John M. Gaines, Jr., '26; Vice-President, John J. Ryan '35; and Secretary and Treasurer, John D. Rumsey '33. Harry G. Brockington '25 was chairman of the meeting. Jack Strickler gave a very fine talk on "Military Aviation Here and Abroad," following which he very willingly and capably answered numerous questions fired at him by the members. It was a very successful get-together, and everybody thought the talk was excellent. — JOHN D. RUMSEY '33, *Secretary*, 245 Elmwood Avenue, Buffalo, N.Y.

Detroit Technology Association

Jerome C. Hunsaker '12, Head of the Department of Mechanical Engineering and also in charge of the Course in Aeronautics at M.I.T., and Alfred V. deForest '11, Professor of Mechanical Engineering at the Institute, had dinner with us on January 31 at the Intercollegiate Alumni Club in the Penobscot Building. Dr. Hunsaker told us about the recent happenings at Technology, including the new wind tunnel and considerable about new air-machine developments. Professor deForest had an interesting story regarding the results of his studies on the fatigue of metals. Our thanks are due to these two gentlemen for an interesting meeting.

On February 21, same location, Russell Barnes, who has spent several years abroad as foreign correspondent for the *Detroit News*, addressed us on "The Significance of Recent Events in Europe." His views covered such questions as: What is it all about? What will it lead to? What are some of the inside angles which we have not read about in the papers? — The Club wishes others could have shared this talk with us. — JOHN E. LONGYEAR '26, *Secretary*, 2000 Second Avenue, Detroit, Mich.

Technology Club of Central Pennsylvania

On February 16 the Club met at the University Club in Harrisburg. Thirty-one members and guests attended. Charles E. Locke '96, Secretary of the Alumni Association, was our guest speaker. His informal talk covered some of the latest developments at M.I.T. and brought us up to date on alumni affairs. There was some general discussion of the Alumni Fund Campaign and its somewhat disappointing financial results. The latest proposal for a continuous fund with voluntary yearly contributions was hailed by most of the members as a forward step.

The whole talk was enlivened by Professor Locke's inexhaustible and sometimes irrelevant and irreverent supply of anecdotes, bon mots, funny stories, *contes drolatiques*, or what has he. It was my impression that these parts of the talk were better understood and appreciated than the more abstruse delineations of such matters as the difference between a cyclotron and a Van de Graaff generator. The meeting closed with the showing of three reels of the latest Tech movies. We are deeply indebted and grateful to Professor Locke for an enjoyable evening.

Among those present were Louis S. Morse '96, President, Edgar A. Weimer '98, Clark A. Bryan '03, William P. Bixby '05, Percy E. Tillson '06, Ralph E. Irwin '09, Hall Sargent '11, Clifford J. Walton '14, Francis E. Thomas '17, Frank E. Peacock '17, Eldor J. Mink '22, Scott F. Nicoll '23, Breese J. Stevens '23, Tien P. Kuo '24, Alonzo W. Ruff '26, George R. Copeland '27, John P. Connelly '28, Harold R. Spaans '30, Byron E. James '32, Nathaniel Goodman '33, Robert P. Landis '35, Walter A. Johnson '38, S. Peterson '36, and Glen R. Slonneger '37. — WILLIAM M. DAVIDSON '26, *Secretary*, Bell Telephone Company of Pennsylvania, 210 Pine Street, Harrisburg, Pa.

Technology Club of Milwaukee

L. D. Smith '06, the President of our Club, was host to the members at a buffet supper at his home on February 14. The meeting was the most successful that we have had in some time, and the attendance was exceptionally good. After dinner, the Rev. Robert B. Stansell gave a truly inspirational talk entitled, "Lincoln, the Man." The interest which it aroused is proved by the extended discussion which followed. The consensus of opinion seemed to be that the average American's knowledge of Lincoln stops with the idealized version of his life which we are all taught in the elementary grades. We all went home with a much more profound appreciation of the greatness of Lincoln as a human being.

Tentative plans for the future call for an inspection trip through Milwaukee's new filtration plant after a luncheon meeting some Saturday afternoon about the middle of April. Election of officers for the coming year will be held at that time. — ROBERT M. OSBORN '36, *Acting Secretary*, 2840 West Highland Boulevard, Milwaukee, Wis.

M.I.T. Club of Northern New Jersey

A capacity crowd of 150 members of the Club threw off technological cares and worries, sang themselves hoarse, called each other by their first names, and, in short, had a swell time. The place: Feigenspan brewery, Newark, N.J. The time: February 3, 7:00 till 11:00 P.M. The reason: fellowship and fun. The host: Christian Feigenspan Brewing Company, Bill Rose, Jr., '21, IV, assistant to the president. The one regret: that about 30 reservations had to be refused because 150 was the limit.

To whom the rising vote of thanks? Well, Bill Coleman '24, Vice-President in charge of programs, and Bill Grady '22, chairman of the beer party committee, with their cohorts, conceived and executed it; Charlie Roche '23 kept it swinging with his incomparable musicians; and the baton of song leader Jack Teeter '22 drew forth from 150 throats some liquid harmony that made the copper kettles ring! A delicious dinner provided the proper foundation, and when every man had had his fill of juicy steaks, along came broiled lamb chops that simply could not be refused. All this through the kindness of Feigenspan and the generous Technology Club spirit of Billy Rose.

But the *sine qua non*, by universal acclaim, was the P.O.N. beer and ale. Its creamy head and sparkling body, in ever replenished glasses, stimulated a technological toot that will long be remembered. Many a cocktail devotee and judge of good beer averred that P.O.N. has "it" to a degree he never knew existed. And so the Club put the stein on the table with great and proper gusto, and departed loud in praise of Billy Rose and P.O.N.

The high spot of the year is the annual banquet which will be held on Thursday, April 20, at the Newark Athletic Club at 6:30 P.M. The program will be not only interesting and fascinating but replete with fellowship and, in short, a banquet that you cannot afford to miss. Raymond Haskell '03 will be toastmaster, thereby assuring the smooth functioning of the evening's program. President Compton will speak in his inimitable way on "What's New at M.I.T." The distinguished "extracurricular" guest of the evening will be Dr. James Shelby Thomas, President of Clarkson College of Technology, Potsdam, N.Y., who will speak on "Culture in the Market Place." Under the stimulus of toastmaster Haskell, there will be plenty of fun and revelry. R. H. Ranger '11 will give a demonstration of a very new and special set of carillon chimes.

The banquet as usual is stag but informal. If you have not received formal announcement, it is because your name is not on the club mailing list, and you should remedy this immediately by sending the information to the Secretary. — CLAYTON D. GROVER '22, *Secretary*, Whitehead Metal Products Company, 303 West Tenth Street, New York, N.Y. FREEMAN B. HUDSON '34, *Assistant Secretary*, Colgate-Palmolive-Peet Company, 105 Hudson Street, Jersey City, N.J.

M.I.T. Club of the Virginia Peninsula

The winter dinner meeting of the Club was held at the James River Country Club early in February. Attendance was unfortunately cut down by one of the very few wintry nights we had all season, but the 30 hardy souls who did attend were treated to one of the finest evening entertainments we have yet been fortunate to offer. At a previous meeting Leslie W. Jefferson, a major from Fort Monroe, told of the antiaircraft exercises at Fort Bragg, N.C., held last fall and of the success of antiaircraft defenses when operating on such a large scale. In answer to the controversy which followed Major Jefferson's talk, we presented as guest speaker Frederic E. Glantzberg '27 of Langley Field at our last meeting. Captain Glantzberg, who is, incidentally, the first Alumnus to address the Club, is an outstanding officer of the Air Corps and acted as navigator on each of the famous flights of the "flying fortresses" to South America last year. His talk, excellently prepared and delivered, gave more feed to the argument of airplanes versus ships and ground forces, and in the discussion which followed, Captain Glantzberg gave up the floor to another Air Corps officer who proved more than a match for the feeble arguments which the local shipbuilders could hatch up. This man, Harold F. George, major in the 96th Bombardment Group and one of the ablest strategists of the Air Corps, provided plenty of fireworks and gave us all food for thought as regards this much feared thing called air power which Hitler used to such advantage at Munich. When the meeting finally broke up at 11:00 P.M., almost the entire company remained and in small groups continued their discussions until midnight.

This newly formed Club is rather proud of its record for the first year. We do not hesitate to put forward the claim that in this small, rather forgotten section of the United States, there is a larger percentage of M.I.T. Alumni than in any other place in the nation. Down here, about 200 miles south of the Mason-Dixon line, we have a thriving community of about 50,000 persons, made up from the combined populations of Newport News, Hampton, and Phoebus, and in that number there are almost exactly 100 Alumni. Considering the naturally high number of negroes here, that makes about one Alumnus in each 300 to 350 of white population. I seriously doubt if any other section can boast of a larger percentage.

In Hampton alone, a small city of about 5,000 white inhabitants and, incidentally, the oldest continuous English-speaking city in the United States (founded in 1620), there are 40 Alumni. — JOHN R. GRAHAM '36, *Secretary*, 216 Manteo Avenue, Hampton, Va.

Technology Club of New York

The formal opening of the new and enlarged quarters of the Club, in the Williams Club Building, 24 East 39th Street, on January 28, marked another milestone in the brilliant 52-year history of this, the oldest and largest alumni club of the Institute. The new building is located in the heart of the Grand Central zone, just two blocks from the station itself, and provides facilities and advantages heretofore found only in the more expensive and exclusive private clubs of the city. Unusually accessible, superbly furnished, and capably managed, the new Club is equipped with private bar, restaurant, private dining rooms, lounge, library, sleeping rooms, squash and tennis courts, and skating rink.

Alfred T. Glassett '20, President of the Club, in a recent letter to all members said: "We are all greatly pleased with the enthusiastic acceptance and use of our new club quarters at 24 East 39th Street. The members who have been there are unanimous in stating that we now have a Club of which we may all be proud, and their continued and consistent use of its facilities, even in the short time we have been there, has proven definitely the value of our move." The change was made following a thorough survey among Technology men in this area to determine the type of club desired by most Alumni. The results of the survey indicated that many M.I.T. men felt the need for a club more complete in its social and living facilities and more in keeping with M.I.T.'s standing in the collegiate field. After a careful study of all available locations, the board of governors decided on the move to the Williams Club because of the complete facilities which the building offered and also because the additional benefits could be obtained without an increase in the cost of annual dues to members. There has been a sharp increase in membership applications and in guest-card requests since the opening of the new Club. Several members have already taken up residence at the Club.

Many functions were being planned as this issue of club notes went to press. Principal of these was the At Home dinner, March 6, at which President Compton spoke; several Classes had arranged dinners; the daily luncheons at the Club continued to be well attended; and the program committee was planning several evening entertainments. Visitors to New York for the World's Fair this summer will find it very convenient to make the Club their headquarters for securing information and assistance in seeing the Fair and the city.

During the midterm vacation a group of undergraduates came down from Boston to inspect the wonders of the Big

You will find on page I information on Alumni Day, June 5

City. They were welcomed at the Club by the President, Mr. Glassett. Then through the courtesy of William H. Latham '26, director of operations of the New York City Department of Parks, the students toured the city in special automobiles. They visited all the important civic works which are open to the public and many which are not open to the public but to which they were admitted through the personal intervention of their host. — ROBERT M. EMERY '34, Secretary, 24 East 39th Street, New York, N.Y. CONSTANTINE S. DADAKIS '34, *Publicity Committee*, 644 Riverside Drive, New York, N.Y.

Technology Club of Philadelphia

About 85 members of the Club met at dinner on Monday, January 30, at the University Club. The first business of the evening was the election of officers for the ensuing year, and the following were elected: President, Walter J. Beadle '17; Vice-Presidents: Greville Haslam '15, Harold F. Marshall '19, and Henry W. Jones '26; Secretary, Philip M. Alden '22; Treasurer, Hal L. Bemis '35; Executive Committee: Cecil B. Annett '02, William J. Kelly '09, René A. Pouchain '17, John L. Keats '20, William W. Quarles '24, Robert T. Leadbetter '31, and Raymond J. Woodrow '36.

Following the elections, B. Alden Thresher '20, Director of Admissions at the Institute, gave a very interesting talk on the work his committee has been doing in selecting the students for the Institute, particularly for the freshman class. After Professor Thresher's talk, A. Rufus Applegarth '35 of the Philco Radio and Television Corporation read a very interesting paper on television. The most interesting part of this paper, insofar as the general public is concerned, was the announcement that commercial television will be telecast in New York during the year, beginning probably about the time that the World's Fair opens. The paper was originally written by Albert F. Murray '18, also of the Philco Corporation, and he led the discussion which followed the reading. This discussion went into all possible details of radio television telecasting and lasted nearly an hour. — PHILIP M. ALDEN '22, Secretary, 1000 Chestnut Street, Philadelphia, Pa. WILLIAM J. KELLY '09, *Review Secretary*, 6409 Woodcrest Avenue, Philadelphia, Pa.

Technology Club of Schenectady

The Club held an impromptu luncheon on February 14, when Dean Moreland '07 was here to talk with Philip L. Alger '15 and William D. Coolidge '96. The group included some of the recent graduates: Lawrence G. Peterson '36, Robert J. Caldwell '36, and Paul Lebenbaum, Jr., '36; and some of our active members: Anthony Hoadley '26, Elbert H. Bancker '18, James S. Woodward '25, Charles J. Koch '23, and Leon J. Goldberg '26. Among a number of interesting anecdotes, Dean Moreland told us some inside en-

gineering stories on the new wind tunnel and the differential analyzer. This made us feel right at home again, and the meeting closed with questions on favorite professors, courses of study, and reminiscences.

Harris A. Thompson '33, our former Secretary-Treasurer, is now working in Detroit, so the list of officers reads as follows: Anthony Hoadley '26, President; Arthur J. Tacy '27, Vice-President; Theron C. Johnson '33, Secretary-Treasurer. — THERON C. JOHNSON '33, Secretary, Engineering General Building 23, General Electric Company, 1 River Road, Schenectady, N.Y.

CLASS NOTES

1885

Edward H. Dewson, 1865 to 1939. Once more death has entered the ranks of '85, this time as the result of an automobile accident in Tampa, Fla., February 9. (A few days later Mrs. Dewson also died.) Ed, as he was always called, was born in Quincy, Mass., July 16, 1865. He attended the English High School in Boston, entered Tech in 1881, and was graduated in June, 1885, an S.B. in mechanical engineering. For the first three years after graduation he was in training in railroad mechanical engineering in the repair shops of the Old Colony Railroad. Then followed three years as master mechanic on the St. Joseph and Grand Island Railway; then, two years with the Thomson-Houston Electric Company, Lynn, Mass.; later, miscellaneous mechanical engineering.

In 1897 he became chief engineer of one division of the Westinghouse Air Brake Company and at the time of his retirement — December 31, 1921 — was resident engineer of the eastern district. He had been a member of the American Society of Mechanical Engineers since 1889. In March, 1925, he became interested in the growing of citrus fruit at Davenport, Fla., and at the time of his death was president of the Holly Hill Fruit Products, Inc., located at Davenport.

Such was his official career, but that doesn't bring out the fact of his genial personality or the ever present feeling of his integrity of character. Partly from his business assignments, which were in various sections of the country, and partly through his travels, he was probably known by more '85 men than anyone except Ike Litchfield and perhaps McKim, who founded the Technology Club of New York. Ed's interest in Tech and in '85 particularly was unbounded. His death is a great loss, and he will be mourned by all. — ARTHUR K. HUNT, Secretary, 145 Longwood Avenue, Brookline, Mass.

1886

Orville B. Denison, Secretary of the Class of '11, has kindly forwarded to me the following announcement which appeared in the January 19 issue of the *Worcester Evening Gazette*: "The funeral

services for William F. Dawson, Washington street, Holliston, who died Tuesday afternoon, took place this afternoon at St. Andrew's Episcopal Church with the rector, Rev. Albert R. Parker, officiating. Burial was in Pine Hill Cemetery, Sherborn, in charge of Arthur J. Stevens. Mr. Dawson was born in Andover, Feb. 10, 1867, graduated from the School of Mechanical Arts at M.I.T., and was an electrical engineer for the General Electric Co. for 43 years, retiring in 1931. He is survived by his wife, Julia; a son, Charles W. of Holliston; a daughter, Mrs. Arnold Wright of Saugus; a brother, James F., of Sherborn, and a grandchild." — ARTHUR G. ROBBINS, Secretary, 12 Grove Street, Winchester, Mass.

1887

First of all the Secretary desires to express his deep appreciation of the courteous tribute paid to the Class and its Secretary by our esteemed friend, B. R. T. Collins, Secretary of the Class of '88, in the closing paragraph of his February notes in *The Review*. It was certainly a pleasure to be of assistance in recommending the facilities and advantages of Marblehead to the Class of '88 as a fitting spot for their 50th reunion and a source of much gratification to learn that their choice was so eminently satisfactory.

While the wintry winds were at their wildest, it was comforting to read a brief message from Nassau, British West Indies, where our classmate, N. P. Ames Carter, was reveling in the warm sunshine and still warmer water, a combination which he asserted was rapidly restoring him to the youth and vigor enjoyed in the "horse and buggy" days. Carter was spending a few weeks with Mrs. Carter at that delightful winter resort and evidently both they and their daughter, who was also of the party, were enjoying the semi-tropical environment to the utmost.

Sturges writes to the Secretary from Hollywood, where he is staying temporarily, pending his removal to his new house at Santa Monica. He says that he arrived in California in January, considerably exhausted by his long journey, and spent several weeks in bed to rest and recuperate, but was able, at the time of his writing, to walk a little around the room. With care and lack of exertion, he should pick up in the warm climate of California, and this we expect him to do. — Herbert Wilcox writes: "As usual I have nothing of interest to report concerning myself. Guess I will have to take another trip somewhere so as to make more copy for you. Brainerd certainly writes very interestingly. Think you should have him regularly on your reportorial staff. (We agree!) We continue to have fine winter here (Pasadena, Calif.), though with somewhat more rain than usual. Was out this forenoon (February 8), found people complaining of the cold. My outdoor thermometer registered 51 degrees."

Brainerd assures the Secretary that, having used up his material in his recent account of his western trip, he must perforce seek fresh subject matter before

1887 Continued

again bursting into print. "Besides," he adds, "I have just assisted Mrs. B. through a broken arm and a major double operation. Three months ago my doctor told me that my pumper was acting up; so I must watch my step and at the same time reduce my weight 25 pounds. At the same time a little architectural work is showing up, which I feel I must do to help along my former employees. I have managed to reduce 20 pounds, but it makes me feel limp."

Ben Lane, deep in a maze of corporation and personal income-tax returns, once again attests his loyalty to his conferees by laying aside for the moment these cares to have a brief "fireside chat" with the Secretary, for which the latter is duly grateful. Ben says: "You remember the play in which the principal character asks everybody if they want to buy a gold mine. Well, if you happen to know anybody who wants to buy a beautiful mortgage on a fine woolen-mill property on the banks of a purling stream in Connecticut or some choice house lots in Long Island, kindly drop me a line, or if it is a good prospect, telephone and reverse charges." — Surely so eloquent and romantic an appeal ought not to be in vain, even in these strenuous times.

Ralph Curtis writes very interestingly and reminiscently in reply to a recent communication from the Secretary: "You ask how I am holding out this wintry weather. I have to answer — very well, all things considered, though I sometimes have a whimsical feeling, in view of the occasional wild and sudden antics of the mercury, that it's rather fortunate that we are made of more flexible material than some known to science; otherwise the output of crack(ed)-pots might outrun the requirements of even these hectic times. Then I recall the long, bleak trek from Newbury Street, across the Public Garden and Common, and 'over the hill' to the old Eastern Depot, with the winds howling up Commonwealth Avenue from the North Pole via Brighton, and I wonder if I am getting soft by any chance. I particularly recall one bitter day when a group of us, having separately negotiated the passage, met on the 4:40 and exchanged congratulations on having made it without mishap. There were Noyes '86, Mulliken, one of the Beverly boys (probably Mosman), and myself, and not until the train had started and the warmth of the car had begun to get in its work, did we discover that every mother's son of us had frozen his left ear and so quickly that we had not been conscious of it. Them were the good old days!

"Last October I was hauled to the fall meeting of the American Society of Mechanical Engineers at Providence to be decorated with a token of 50 years of membership therein and enjoyed also the opportunity to see the effect of the big wind and tidal wave and especially to get the firsthand accounts of military and civil officials working on salvage and rehabilitation. Schwarz (with Mrs. Schwarz) was at the meeting on the same errand. I am living the rather uneventful

life of a retired engineer, with what grace I can, and trying to keep somewhat in touch with current progress. It has been a pleasant feature that so many of this season's technical meetings which specially interested me have been held at Tech, either at Walker Memorial or in one of the engineering lecture rooms. I realize (and for your sake regret) that none of the foregoing makes news, but it is pleasant to have excuse for a bit of chat with you, and to say 'present and accounted for.'"

While it may be true that some of the foregoing, as Ralph says, does not "make news" in the modern reportorial sense, it is nevertheless true, as has been quoted in this column before, that "reminiscence is the special privilege and consolation of advancing years, and to live through boyhood's happy school days, and to survive to recall them, and to have the opportunity to tell about it, is to be thrice blessed." To the foregoing sentiment we all, at this stage of life, heartily subscribe. — NATHANIEL T. VERY, *Secretary*, 15 Dearborn Street, Salem, Mass.

1888

During my sojourn in Norfolk, Va., in January and February, I was fortunate enough to be invited by Mr. and Mrs. George W. Roper to a real southern dinner in their Colonial mansion on Freemason Street. Present also were a number of their relatives and friends. All that needs to be said to any of us who attended the Ned Webster class dinners is that it compared favorably with them and that Ned and George speak the same language as connoisseurs of the best liquid refreshments. The following day George took me in his Buick to the plant of the Norfolk Shipbuilding and Dry Dock Corporation of which he is president and general manager, and showed me his floating dry dock, his three marine railways, his wharves and docks, his machine, forge, copper, and pattern shops, and the office building. On the largest railway was a 6,000-ton ship which had been in collision a few days before off Cape Henry, and the men were repairing what George called a "\$6,000 hole." They name these jobs according to the cost for repairing the holes. On another railway was a United States Engineers' centrifugal dredge undergoing a complete overhauling including a new steel mast made entirely by the company. It was a fine-looking job, and George could not be blamed for being proud of it. All the docks were full of all kinds of craft being repaired. They are very busy at the present time, employing over 600 men.

In the *Engineering News-Record* of December 15, there is a sketch of the work of Joseph P. Newell with a fine likeness of him as he looked in later life. — Probably no one in our Class realizes that we have a member who played a part in connection with the committee who established standard time on November 18, 1883. He is William G. Besler, our 50th anniversary orator and chairman of the board of directors of the Central Railroad Company of New Jersey. In 1883 he

was private secretary to General Manager Stone, a member of the committee which established standard time. He has written "The History of Standard Time," from which we quote the following excerpts: "Back in the days before the introduction of the railroads and the telegraph, when the quickest means of communication was by stage coach or post rider and about two days was the shortest time for a person or message to travel between the two largest cities in the country, New York and Philadelphia, exactness of time was of little importance. Then and for centuries before, each community used what was known as Sun Time. As the name implies, this time was determined from the sun, that is, it was noon when the sun was directly overhead. Under this method of keeping time there were many different times in use throughout the country, which varied greatly. In order to keep correct time on a trip from New York to Boston, it was necessary to change a watch three times during the journey. To overcome this difficulty each railroad would adopt for its operating purpose the time of some important city which it served. Thus for example, the Central Railroad of New Jersey used New York Time, while the Philadelphia and Reading used Philadelphia Time. This in a measure solved the railroads' operating problem, but it left a complicated situation for the traveling public. The communities continued to use 'Sun Time' and the various railroads frequently used different times, so it was a familiar sight to see in larger hotels several clocks, one labeled 'local time' and on the others the name of a railroad. An examination of the timetables of two or more roads necessary to make a certain trip would indicate ample time to make the connections, but often the passenger would find that when he arrived at the end of one road, the other road used another time and that the train he expected to take had already left. In 1881 there were over fifty different times used by the railroads in the United States and many more by the cities and other communities. . . .

"Finally in October 1881 the whole problem was referred to William F. Allen, Secretary of 'the general time convention' and editor of the *Official Railway Guide*, who after more than a year's work on the subject made his report in April 1883. His knowledge of the railroads and their operating requirements enabled him to prepare an even hour plan with a method of passing from the use of one hour to another without danger of interference or mistake and definite information respecting the changes required in the schedule of every train on each railroad in passing from the old to the new standard, so as to preserve unbroken the relative time and connections with trains of other roads.

"This plan was submitted to the railroad managers in April 1883 and they voted unanimously to put the plan in effect on all lines on November 18, 1883. By this change, at the stroke of noon on the above mentioned date, fifty different

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1888 Continued

standards of railroad time resolved themselves simultaneously into four, while the minute and second hands of watches and clocks were reset at all points to the same mark on the dial.

"Soon local time ceased to be used in most communities. The standard time of the railroads was adopted as the standard for practically all places in the United States and Canada. On the day the railroads adopted Standard Time, New York set its time back four minutes and Philadelphia advanced its time one minute. By an act of Congress, approved March 13, 1884, the time of the seventy-fifth meridian (Eastern Standard Time) was established as the legal standard of the District of Columbia. . . .

"People of the present generation can hardly appreciate the difficulties which the former numerous times presented to the traveler, and from which they have been happily saved. The writer (W. G. Besler) is one of the few railroad men now in service who can recall the confusing conditions prior to the introduction of Standard Time." — BERTRAND R. T. COLLINS, *Secretary*, 16 Chauncy Street, Cambridge, Mass.

1890

Under the heading, "The Glass Giant of Palomar," the *Reader's Digest* for February condenses from a book of the same title the story of George Hale's work resulting in the giant telescope soon to be in use in California. Outlining Hale's early studies and discoveries, it continues with the thrilling tale of how, "begun as one man's dream, through Hale's scientific vision, engineering genius, human persistence in the face of failure, flood and heartbreak" there is resulting "an instrument which many scientists believe will represent the greatest achievement of this century."

Vermonters are pleased with the report of William B. Poland, railway expert, who was appointed last summer to study the Vermont railroad situation in connection with the Rutland Railroad which is controlled by the New York Central and New Haven railroads. Poland said: "In my judgment not one Rutland division could be dispensed with without dealing an almost fatal blow to the earnings of the whole system."

Harry Burley's name is on the ballot this year for class representative on the Alumni Council, this being the year in which we reelect for the ensuing five-year period. — The Alumni Office reports the following new addresses: Eugene A. Holmes, 447 Paloma Drive, Pomona, Calif.; Ernest A. LeSueur, 429 Daly Avenue, Ottawa, Ontario, Canada; Walter G. Peter, 3027 N Street, N.W., Washington, D.C.; George A. Sonnemann, 309 South Wall Street, Spokane, Wash. The Alumni Office also advises that mail addressed to Herbert Seavey at Stoughton, Mass., has been returned. Can anyone give us Seavey's correct address? — GEORGE A. PACKARD, *Secretary*, 50 Congress Street, Boston, Mass. HARRY M. GOODWIN, *Assistant Secretary*, Room 4-136, M.I.T., Cambridge, Mass.

1892

Ralph H. Sweetser is the author of a new book entitled "Blast Furnace Practice" (356 pages), just published by McGraw-Hill Book Company, New York. The book deals with the making of pig iron in the present-day furnace; describes the raw materials, plants, and equipment used, and the products and by-products manufactured. Here is a comprehensive treatment of all aspects of the production of pig iron not only for those engaged in the field but also for all concerned with the production and use of iron and steel products. The book covers the blast-furnace plant, equipment and raw materials, operating practice, character and utilization of products and by-products, theories of the process, commercial aspects, and obsolescence, with emphasis on the operating man's viewpoint. Sweetser is particularly qualified by long experience in the field on which he writes. Hutchinson saw Sweetser in New York in February at the annual meeting of the American Institute of Mining and Metallurgical Engineers. — JOHN W. HALL, *Secretary*, 8 Hillside Street, Roxbury, Mass. W. SPENCER HUTCHINSON, *Assistant Secretary*, Room 8-219, M.I.T., Cambridge, Mass.

1895

Another '95 man and his wife have developed the wanderlust and followed the trail to Florida. Eddie and Mrs. Alden of Hartford, Conn., surprised your Secretary when they put in an appearance at Clermont, Fla., on Thursday night, February 9. They had covered many of the red lines of the road maps of Florida and were on their way to Tallahassee but decided to "pay their respects" before going north. There are a number of places in the interior of Florida which are inaccessible by telephone, and being unable to announce his coming, his late arrival in the evening compelled Eddie to find us with a flash light. At last we all got together and had a "foursome reunion" late into the night. The Aldens are preparing to take a "trailer cruise" along the coastal boundaries of the United States and expect to have their equipment ready by the end of this year. Their plan is to cover all coast lines of the States during a sojourn of possibly eight to nine months. You may recall that the Aldens are bathing enthusiasts, which possibly accounts for their determination to stick "close to the shore" during their adventures throughout the United States. Their experiences will unquestionably be good reading at some later date.

Richard Brinsley Sheridan, as we announced last month, passed away on January 22 at his home, "Springcrest," on the Albany Post Road, Ossining, N.Y. There were only a few of the original 142 graduates of the Class who had taken Course XIII, Naval Architecture, and Dick Sheridan was one of them. He was born in London, England, on September 10, 1872, and a large part of his active life was spent in England and the countries of Europe. He had studied at Yale Uni-

versity before coming to Technology. After leaving Tech he served about a year and a half with the United States Navy as a computer and was stationed at Newport News, Va. Following this service he joined the Brown Hoisting Machinery Company of Cleveland, Ohio. He spent some eight years in Europe with headquarters at London. Leaving this company as general manager, in 1916 he joined the American International Corporation, a New York City investment trust, and worked principally in France and other countries of Europe. During the Spanish war he was in Russia, overseeing the erection of large blast-furnace equipment. When our States entered the World War, Dick Sheridan was in France, and not being able to join the ranks, he did what he could to assist our Army to get their offices in shape, helped to find men who could understand French, and assisted in the buying of supplies. He also aided most effectively in getting supplies to the Allied countries.

Unique as it may seem, Sheridan was the only member of the Class, so far as is known, who had his obituary published while he was still alive. The following appeared in the *Boston Evening Transcript* of October 4, 1918, when fighting during the World War was at its highest: "Killed in Action — Richard Brinsley Sheridan. . . . A lieutenant, Richard Brinsley Sheridan, reported in today's list of killed in action, may be a New York business man, who was born in London, England, in 1872, a son of Henry Brinsley Sheridan, of English ancestry and a collateral descendant of the famous author, diplomat and playwright, Richard Brinsley Sheridan, one of England's greatest men of his time. He studied at the Sheffield Scientific School at Yale and also studied at the Massachusetts Institute of Technology, where he took his B.S. degree in 1895."

Sheridan's professional societies included the American Society of Mechanical Engineers, the Society of Naval Architects and Marine Engineers, and the American Iron and Steel Institute. His social organizations covered membership in Sigma Chi, the Yale Club of New York, the Engineers Club of New York, the Tavern Club of Cleveland, the Technology Club of New York, the Sleepy Hollow Country Club of Scarborough, N.Y., and the Bankers Club of New York. Surviving are his wife, the former Marguerite Shelley Pechin; a daughter, Mrs. Stuart B. Carter, Buchanan, Va.; and two brothers, Lieutenant Colonel Henry H. Kimball Sheridan '96, United States Army (retired), and C. K. Sheridan, both of Cleveland, Ohio; and his mother, Mrs. Clara Kimball of Ossining, N.Y.

Louis M. Allison may be found at Cicero, Ill. Oscar C. Child has moved to 840 Grand Concourse, New York, N.Y. — By the time these notes appear, Fred B. Cutter of New York will have a report of the number who may be able to attend the 39th reunion of the Class, next June, in New York — in connection with the New York World's Fair. The present plan is to hold at least a one-day reunion.

1895 Continued

After the reunion classmates can attend the Fair as their time may permit. Our class reunion in New York will follow conveniently the M.I.T. Alumni Day in Cambridge and the graduation exercises, which will be held next June 5 and 6, respectively. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass. JOHN H. GARDINER, *Assistant Secretary*, Graybar Electric Company, 420 Lexington Avenue, New York, N.Y.

1896

All the news this month will be about the Assistant Secretary, who, in his professional capacity as M.D., has the Secretary confined at home nursing a cold at the time these notes are being written — the end of February. King John also took advantage of Billy Anderson, who came to Boston for a little visit at the middle of February. Somehow Billy was unable to combat the Boston type of cold germs; so John put him to bed at the Copley Plaza. Mrs. Anderson, who also came along, was treated likewise for the same complaint. In order that he might not be accused of showing any partiality, Dr. John had Mrs. Rockwell under treatment for several days, confining her first to her room and not allowing her even to leave the house later until she had fully recovered.

Classmates have known of the long connection of Dr. John with M.I.T. athletics, including his period of continued service as chairman of the Alumni Advisory Council on Athletics. On Tuesday, February 14, at the joint meeting of the Advisory Council on Athletics and the M.I.T. Athletic Association, Henry E. Worcester '97 made an official presentation of a watch to Dr. John. This presentation had special significance. The watch in question is a fine timing watch in gold case, originally presented by the Alumni Association away back in 1911 to Frank Briggs '81, who organized athletics at the Institute in their present form and who was the first chairman of the Advisory Council. When Major Briggs passed away, the watch passed on to the late Allen Winter Rowe '01 who served so faithfully as secretary of the Advisory Council, and Dr. Rowe wore it for many years. At his death the watch was returned to Major Briggs's family, but the family felt that the watch should be worn by the member of the Advisory Council who had served the longest. It will therefore be carried by Dr. Rockwell during his lifetime, and will then be passed on to the member of the Advisory Council having the next longest record of service. Actually Dr. John has been chairman of the Advisory Council on Athletics since 1911, when Major Briggs resigned from that office. The case is properly inscribed for the first presentation to Major Briggs, and the name of each possessor is being added as time goes on.

Being handicapped by preparing these notes at home, the Secretary will have to reserve until next month other items dealing with his meeting with the classmates in New York, his trip to Harris-

burg, and various other items, not omitting a very particular feature in the form of a long letter from Con Young written by Con on his new typewriter. It is a tremendous improvement over the old procedure, when a letter from Con served as knitting work for spare moments over a period of several days while one gradually interpreted the handwriting. The following excerpt is a splendid illustration of Con's fine, polished job with his new portable Remington: "A carpenter helped me one evening to set the six corner posts and ceiling and floor ties. They were twisted and within a half inch of parallel and plum. Anyhow they were firmly niled and I was glad of that, even though it did take me hours afterwards to twist and hammer them into shape. It was a tough job with this pitch soaked nativ pine." — CHARLES E. LOCKE, *Secretary*, Room 8-109, M.I.T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

1898

Charley Hurter and his wife are taking a trip to South Africa this winter. — The following is from Edgar A. Weimer, 245 Seneca Street, Harrisburg, Pa.: "I wish we could split our five-year reunions and make them every two or three years. We will soon be reaching that age when we will not care to roam from our firesides, but to tell you the truth, I seem to forget that I am growing old as I have enjoyed such perfect health and have so many hobbies to keep me busy between jobs. I would suggest that the meeting place for our next reunion be determined by sticking pins in a map and thus determining the center of mass of our Class and that we hold our meeting at or near such center. On looking over the past lists of those present, I find that there seems to be a rather constant factor of fellows who appear to care for old friendships. It is also said to be a fact that when one grows old, he is apt to enjoy only the local club members whom he sees quite often and with whom he has things in common. I hope this will not be the case with our Class."

Roger Babson's syndicated articles on economic questions continue to appear regularly. Every Saturday night in the Boston *Evening Transcript* we look for one. On October 10 we noted the following: "The past week I have spent in London quietly interviewing great statesmen, bankers, industrialists, and economists. They unanimously agree that we may now be entering a period of prosperity exceeding in importance that of the '20's, following the Armistice of 1918." — This is the cabled conclusion of Mr. Roger W. Babson, who has been in Europe studying conditions." Somewhat later he predicted a Red-Nazi war. On February 18 he gave eight reasons why the dollar is still good. — General George B. Pillsbury's new address is 2140 Broadway, San Francisco, Calif.

We note that Paul F. Johnson is chairman of the finance committee of the Altadena Republican Club. Paul was recently house cleaning and, in his reluc-

tance to destroy them, sent to the Class Secretary two old letters received by him from Howard Coburn in the summer of 1897. Howard was spending part of his summer vacation at his home town in Maine, and Paul was taking some summer work at the Institute. The letters simply told of ordinary, everyday events, but what impressed us was the beautiful handwriting: It was as perfect as a copperplate wedding invitation. Would that more of us could write such a hand! It was good to be reminded of Howard Coburn, one of the finest, most unselfish men who ever lived and probably the best-loved man of our Class. Who of us who attended our 15-year reunion at Wianno can forget his contribution of good-fellowship to that occasion!

We are saddened in reporting the passing of five more of our classmates: Fred C. Boardman, VI, 18 Winneway Street, Natick, Mass., died on October 22. He was a partner in the Boardman Shoe Company of Boston. Paul McJunkin, VIII, Wrightsville, Pa., died on December 22. Carleton S. Koch, V, Fort Pitt Steel Casting Company, McKeesport, Pa., died on December 18. He was with us at our reunion last June. He organized and was president of the aforementioned company. Edward Sturtevant, IX, St. George's School, Newport, R.I., died on January 17. William M. Perley, V, 1 Vernon Street, West Medford, Mass., died on February 4. He was a member of the Alumni Council representing San Francisco, where he spent several years manufacturing lactic acid. Several years ago he came back and made his home at West Medford. Since returning East he had been the mainstay of our local group of '98 Alumni. — ARTHUR A. BLANCHARD, *Secretary*, Room 4-160, M.I.T., Cambridge, Mass.

1899

Plans are being completed for the 40th reunion of the Class, to be held June 3, 4, and 5. Sunday, June 4, will be the big day for the Class. June 5 is Alumni Day at Cambridge, and Miles Sherrill says we will be "on the spot" unless we have a good attendance. Arthur Hamilton, Arthur Brown, Miles Sherrill, and W. A. Kinsman are coöperating to make arrangements for suitable accommodations near Boston. They are very enthusiastic and expect to make this one of the best reunions the Class has ever had. They need help, though, and it is hoped that every member of '99 will make himself a committee of one to see that some other member attends as well as himself. Some 30-odd members have already signified their expectations of attending. We should be able to add substantially to that number. Full details concerning time, place, and other plans will be sent you in a circular letter soon. In the meantime, mark the 3d, 4th, and 5th of June on your calendars.

According to an announcement received from Arthur D. Little, Inc., their routine testing and chemical analysis work, other than that required for research and development, will be referred to Skinner and

You will find on page I information on Alumni Day, June 5

1899 Continued

Sherman, Inc., 246 Stuart Street, Boston, Mass. Hervey J. Skinner, a member of the firm of Skinner and Sherman, was at one time an executive of Arthur D. Little, Inc., whose officials expressed strong confidence in the qualifications and reliability of the Skinner and Sherman laboratories for this type of technical work.

Another bit of news came my way through the press — Rood and Pray please note. The Bath Iron Works, of which W. S. Newell was president, has, I understand, been sold. This has not as yet been confirmed by Newell. — It is with regret that I announce the death of Alice M. Gray in January. She entered Tech with our Class and took her M.D. degree at Tufts Medical School in 1900. For more than 20 years she served as a Boston school physician and formerly had charge of the orthopedic department of the New England Hospital and was associated with the Massachusetts General Hospital and the Children's Hospital. Working with Mrs. George Agassiz she helped to establish one of the first diet kitchens for undernourished children. — W. MALCOLM CORSE, *Secretary*, 1901 Wyoming Avenue, Northwest, Washington, D.C. ARTHUR H. BROWN, *Assistant Secretary*, 53 State Street, Boston, Mass.

1900

At a meeting of the Boston Advertising Club, held January 24 at the Statler, a motion picture was shown describing the scenic splendor of New England's historical and recreational centers. Charlie Smith, Vice-President of the New Haven railroad, introduced the picture to the ad club members.

George Russell writes: "I know you will be surprised and grieved to learn that Will Angus died in his Chicago home on October 8. The news came to me at Christmastime and I at once wrote to his associate in business for particulars. I learned that Will had not been in good health for about two years and had been advised by his physician to take things easy for a while. He did give up active work but found it difficult to remain inactive. Bill was artistic in temperament and enjoyed sketching and painting. Accordingly, he proceeded to spend much time in this work and found happiness and pleasure in it. Last summer he submitted a painting to the Chicago Art Institute for the All American Exhibition of Painting and Sculpture, doing so, he said, 'in fun.' Two days before he died, word came to him that the New York and Chicago art jury had passed his painting, and it would be hung at the exhibition on November 20. It is hard to realize he has gone. We all recall his being at East Bay Lodge on the occasions of our 25th and 35th reunions. His jovial good nature and love of clean fun made him a wonderful companion in times like these. He stood for the best in life. In the business world, success came as the result of hard, conscientious work, and there, as in private life, he was surrounded by a host of friends. The last time I saw him he spoke eagerly of the coming 40th, and

we parted with a mutual promise that we would meet then if nothing happened. Something happened. Dear Old Bill!"

Mail has been returned from the address of Irving C. Weeks, IX, of 7 Holburn Street, Roxbury, Mass. Any information will be appreciated. — We are indebted to Lonsdale Green '87 for the following notice: "Funeral service for Dean Hinman, former construction engineer for the Chicago Great Western Railroad, will be held in his home at 1363 East 50th Street. . . . Mr. Hinman, a native Chicagoan, died Wednesday [January 18], at the age of 62. His widow, Frances Rix Hinman, survives." Green writes: "Probably I knew Hinman about as well as any of the local Tech men. I first met him in 1912-1913 when he was connected with the Leonard Construction Company (Clifford M. Leonard). I had some work in connection with what Hinman was doing. Then from time to time he would attend our meetings. Never the noontime lunches, for his work would not permit. He was quiet, shy, and unassuming, as he had an imperfection in his speech. I judged that he originally stammered and to cure himself of that, he took his time and hesitated with an occasional catch of breath. Diffident might be the word. And yet at meetings he always sought me out for a word or two.

"Our last published yearbook shows but seven men of 1900: Three of them live in Chicago; one in Elgin; one in Lombard; one in Evanston; Cliff Leonard spends much of his time away from here. Our yearbook of 1914 listed 18 men of 1900. And half of those now living have moved away from the Chicago zone. The M.I.T. Directory of 1930 has Hinman as with the Chicago Great Western Railroad. The directory for 1935 has him as a salesman. He attended the annual banquet here about November 30, 1937 (our last one), and at that time he told me he was with the railroad, as stated in the obituary. He was so shy that I doubt if anyone ever became 'chummy' with him — for that was not his nature — excepting, of course, his own folks and those with whom he came in contact in his business. He always was a good listener and had little to say. I doubt if any of the local 1900 men — what few there are — ever knew him intimately. For of the seven we have, they themselves are of the kind that seldom come out. Except Phil Moore who might, but Phil was 1901."

The following letter is from Jim Batcheller: "My conscience has been hurting me for months, in fact ever since I reached home early last September. You see, it's this way: When you asked me last August, at the time I called on you, to write an item for the class news column in *The Review*, I foolishly agreed. I thought I'd find time after I reached home, but I didn't. When I relaxed in my own cozy corner on September 2, I found I had motored, since June 20, 16,500 miles! And I was tired, honestly I was. Of course, I did not hold the wheel that entire distance, though I did drive more than half of it. First I had my sister-in-law and my niece from Boston out here on

a month's visit. We drove from Canada to old Mexico, much of it along the marvelous scenic roads by the Pacific Ocean, besides many lateral trips such as Mount Hood, McKenzie Pass, central Oregon, Crater Lake, and so on. When they entrained at Los Angeles, eastbound, my nephew, W. F. Herman of Lincoln, Mass. (now M.I.T. '42), joined me, and we drove to the lovely Lake Chelan, Wash.; Grand Coulee, and Spokane, Wash.; the Coeur d'Alene mining district, Idaho; Butte, Yellowstone Park, Salt Lake City, Southeastern Utah, Mesa Verde National Park, Southwestern Colorado, over the Colorado Million Dollar Highway, through the famous San Juan Mountain mining districts in Colorado, over Monarch Pass — 11,500 feet high — down into Salida, Colorado Springs, and Denver, and home over United States Route No. 30 to Chicago; then Niagara Falls, Canada, to Boston.

"After a week's rest in Mattapoisett, Mass., I drove to the United States Naval Academy to pick up my youngest son on his return from the Midshipmen's Practice Cruise to Europe and then went back to Boston. This time I picked up my oldest son, E. H. Batcheller of the Construction Corps, United States Navy (now M.I.T. '39, with the naval group), and with these two sons drove back to Oregon, arriving September 2. En route west, my second son and his wife were visited by us at Woodstock, N.Y., where they were acting members of the Woodstock Repertory Playhouse, a summer theatrical group. (By the way they are getting a great thrill in New York at present, acting together as 'extras' in the much tooted, successful new play, 'The American Way.') When we three reached Oregon my third son came up from California, on his vacation, so for a while I had three of the boys at home. This third son has announced his engagement to Miss Virginia Dahlgren of Castle Rock, Wash., and he expects to be married in June. By the way, I do not recall if I have yet reported that I now belong to the Noble and Ancient Order of Grandparents! Lieutenant E.H.B., U.S.N., M.I.T. '39, has a son, E.H.B., Jr., almost two years old.

"I have not much of interest to report of my doings since September. I am this year on sabbatical leave from the mining department of Oregon State College, so am free to enjoy complete liberty. I went to California (bay region) to visit my son and some mining friends during the year-end holidays. Before and since this last trip I have been, and still am, busy trying to keep ahead of nature on my six acres here. There is a lot of landscaping, which I try to do personally, for it is highly beneficial to my waistline! (Thank the Lord my middle still measures less than my chest!) In January I had a mighty pleasant visit in Seattle, where I motored for a visit covering most of three days with Bob Leach, who, with his wife, was making a short visit to one of his married daughters to see a little new granddaughter. (I believe Bob has five grandchildren now.) Did you know that

1900 Continued

Bob is now general manager of all of Handy and Harman's many operations in the United States and Canada, and also first vice-president of the corporation?

"This brings me to the plans I am making for this summer. For the first time since I left Technology in June, 1900, I believe I am going to be free at the right time to attend our class reunion, or Alumni Day, or dinner, or what have you? I know so little about the usual sequence of events at Tech at this time, I wish you would write me a little note telling me the usual procedure, *i.e.*, list of events and the exact dates. I want to arrange to include as many as I can, yet I must leave for home immediately after the oldest boy gets his M.S. in Naval Architecture. When are the graduation exercises, A.M. or P.M., and on what day, June 5 or 6? I have to be back here on June 15, as I shall receive a visit from a cousin for a week, and we both plan to attend my son's marriage. It is a 3,500 mile motor trip, so I'll need plenty of time, especially if I have to make it alone. If you know some compatible soul who is a safe, conservative driver, who is able to finance his own personal expenses and willing to earn his transportation by a turn at the wheel, I'd be glad to know of him. We might make a mutually satisfactory deal. Just at present I do not have any westbound traveling companion in mind. To close this unexpectedly long letter, I will add that Bob L. and I made our boat reservations while recently in Seattle to sail from that port on June 27 for a circle trip to Yukon Territory and Alaska, via Juneau, Skagway, Whitehorse, Dawson, Circle, Fairbanks, and Seward back to Seattle the latter part of July, just for a vacation trip. I hope all is well with you, and I'll appreciate an outline of information (if only on a post card) whenever you find it convenient. Best regards and remembrances to any 1900 men you see." — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

1901

Since making reference in the class notes of the March Review to the recent talks made by Fred Clapp in England and in this country relative to his explorations as a consulting geologist in Eastern Iran, your Secretary has received a printed copy of the address which Fred made in London in October. This address is very interesting and we wish there were room to include it in these notes, but as that is not feasible, we have an idea that any classmates who are interested can secure copies from Fred if they will write to him at his New York office, 50 Church Street. This is suggested because several classmates, as well as the Alumni Office, have sent in references to the travels of Fred Clapp and apparently there is considerable interest as to just what he was doing over there in Iran and elsewhere in connection with the affairs of the Amiranian Oil Company. We wish we could more frequently secure interesting news regarding other classmates, and we definitely give assurance that no one will

be accused of being a publicity hound if such items of interest are personally sent forward for inclusion in these notes.

For example, our Class President, Lammot du Pont, is personally very modest and probably does not believe it to be proper to send forward any news items about his company. Fortunately, however, the newspapers have had occasion to make numerous references to addresses made by him on several occasions. Mention of one of these was made in the class notes for the December edition of *The Review*. Another very interesting reference by the Associated Press on December 1 was printed in the *New York Herald Tribune* of December 2. This was in regard to the testimony which Lammot presented to the United States Senate's committee on profit sharing. Many interesting comments were included in his testimony, and even at this late date may be profitably read in the December 1 article by the Associated Press.

More recently our classmate, Ted Lange of Springfield, Mass., has sent in a clipping which appeared in the *Springfield Daily News* of February 4 and which is so interesting that we quote it: "The continuous development of new and better products, and the 'courageous investing of venture capital' by industry generally, would be an important contribution to the solution of the nation's unemployment problem, according to Lammot du Pont, President of E. I. du Pont de Nemours & Company. Mr. du Pont said that the adherence of his company to this policy over the years has produced a healthy growth, new jobs and expanding opportunities for work in its plants. He declared that there is a need not only of establishing new industries, but of effecting changes in old industries that will reduce waste and costs. 'This is a task,' he said, 'that involves replacement of billions of dollars worth of worn-out or obsolete equipment with more efficient tools of production.' Mr. du Pont referred to the 1936 study of the Brookings institution, which estimated that there was a durable goods deficiency as a result of the depression that would cost between \$25,000,000,000 and \$30,000,000,000 to make up. This work, he pointed out, still remains to be done. He added that if it were undertaken 'it would supply jobs to approximately 3,000,000 of the unemployed for a period of five years.' While emphasizing the need for new investments, Mr. du Pont declared that before idle capital will be released by industry generally, we must have 'wise tax laws and carefully considered regulatory legislation.' Then, he asserted, 'idle capital would be released for the purposes for which it is so urgently required — to rebuild obsolescent plants, establish new plants, and encourage much needed developments that would make possible lower costs to the consumer and thus a wider distribution of industry's benefits, particularly through increased employment.' 'Venture capital and employment go hand in hand. Impair or frighten the first and the latter is indirectly and importantly reduced,' he said. 'More capital

— venture capital that blazes new trails but is distinct from credit, which shies from venture — always has been essential for business progress. Such capital can be obtained only out of surplus, the income not consumed by current needs, and from the savings of people who can afford the delays and possible losses of experimentation.'"

Another one of our Class Presidents, Ellis Lawrence, who was president during our senior year and thereafter until he departed for Oregon in 1906, and who is now associated with Bill Holford (also one of our classmates) in the architectural firm of Lawrence, Holford and Allyn in Portland, Ore., has recently sent in comments to the effect that Holford is at present giving all of his time as state architectural adviser to the Federal Housing Administration for Oregon. Ellis stated that another classmate, Arthur Trenholme, also of Course IV, is teaching at the Washington High School at Portland, Ore. As for himself, Ellis states that he is now completing his 25th year as dean of the school of architecture and allied arts at the University of Oregon. He states that he makes a trip weekly to Eugene, Ore., where the university is located, and that the rest of the time he tries to make a living in Portland; furthermore, the living must be reasonably good at present, for Ellis states that his office is now very busy on a number of contracts for the P.W.A., and among others mentions a library, an auditorium, and a laboratory wing at the medical school, a tuberculosis hospital for the state, and a classroom building on the campus of the University of Oregon. Ellis states that he and his associates "are encouraged by a few leads which indicate private capital is getting into the field once more, and that apparently all that is needed is a further renewal of confidence — something long lost." Incidentally, Ellis states that he has acquired three nice daughters-in-law and one very nice granddaughter, that at odd moments he collects agates, and that he will appreciate information regarding semiprecious stones in other localities from '01 men in the field. Obviously, therefore, Ellis has become a very efficient collector, but he would undoubtedly admit that while his agates may be termed semiprecious, his daughters-in-law and granddaughter must be classed as entirely precious. Finally, Ellis noted that his oldest son — Abbott '32 — is now associated with him in his office.

Our Class Vice-President, Joe Evans, is also actively connected with the P.W.A. and has recently sent in several very interesting brochures on what is being done by the P.W.A. in his own territory and elsewhere. Joe, you will recall, makes his headquarters at 2040 Howard Street, Omaha, Neb., and if any of the fellows are traveling out that way, we are positive that Joe would give them a most cordial welcome to Omaha. Furthermore, all those interested in the efficient manner in which Joe is handling whatever P.W.A. projects he has under his jurisdiction should write to him even if they can't make him a visit, for we are sure that he

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would be glad to make numerous comments and in addition would undoubtedly be glad to send forward copies of the brochures which we have received.

The Alumni Office has sent the following changes of address: Miss Ethel A. Gleason is now located at 560 Bernardston Road, Greenfield, Mass. Captain Ralph Whitman is now at the United States Naval Operating Base, Norfolk, Va., and Arthur Little is at R. D. No. 1, Box 202, Port Jervis, N.Y. Arthur's address was missing from the 1935 Register of Former Students and for years his name has been on the missing address list for our Class, but perhaps he will now favor us with some comments as to what he has been doing while he has been off our records.

We are most sorry to have to announce that, through Bill Vermilye, who is a vice-president of the National City Bank of New York, we have just learned that Huse Blanchard, who was graduated from the Course in Architecture, died at Barnstable, Mass., on or about November 4. Bill states that Blanchard had been ill for a little over three years and that it was through the unflinching care and sweet disposition of his dear sister, Miss Marie Blanchard, that he remained happy and contented to the last. Bill wrote rather hurriedly, but as he was a very special friend of Huse Blanchard, we hope he may be enabled to send forward for inclusion in these notes some further information regarding Blanchard's business life and other associations. — ROGER W. WIGHT, *Secretary*, The Travelers Fire Insurance Company, Hartford, Conn. WILFORD W. DOW, C.P.A., *Assistant Secretary*, 20 Beacon Street, Boston, Mass.

1902

The Secretary has to record the death of another classmate, Charles S. Thomas, who died November 20. Thomas was a Course III man and followed the profession of geologist and mining engineer, actively and as consultant. After leaving the Institute he went to Colorado and was engaged in mining engineering with various mining companies. In 1911 he took up residence in San Francisco as consultant in mining engineering and geology, but in 1912 entered the employ of the Union Oil Company of California with headquarters at Los Angeles. He remained with them until 1921 when he returned to the consultant business in which he remained until the time of his death. — Cates has again been honored, having been named a chevalier of the Legion of Honor. — BURTON G. PHILBRICK, *Secretary*, 246 Stuart Street, Boston, Mass.

1904

During the year 1938 the Massachusetts legislature passed an act creating a waterways division in the state's department of public works, and Commissioner William F. Callahan appointed our classmate, Richard K. Hale, as director of the new division. The act which created the division placed under its jurisdiction all matters relating to the various state tidal

waters, harbors, and rivers, including a plan for a long-range development of the port of Boston, and Director Hale will be in charge of the entire setup of the division and its activities.

Seldom has there been an appointment of a man so obviously equipped for the task, both in background and ability. General Hale is one of the original "port men," for he was associate commissioner for the old waterways and public lands division in 1919. When this was merged into the full public works division, he remained on as one of the three general commissioners. He has made several studies of the needs of the port of Boston. He is an expert on erosion of coastlines. He is a recognized authority upon many engineering problems, especially those relating to the Cape Cod Canal. He was active in the construction of the recently built Gloucester fish pier. He took a leading part in the construction of the New Bedford state pier and the one in the Cape Cod Canal. Many more accomplishments could be listed along similar lines. His work is well known to maritime leaders, whose confidence he enjoys. For many years he has represented the department in the state planning board, metropolitan district commission, and the state reclamation programs.

On the personal side, General Hale is a resident of Brookline, a graduate of Harvard as well as of M.I.T., and prominent in many engineering, military, and patriotic societies. He has been president of the Society of the Sons of the Revolution in Massachusetts and a member of the Society of the Colonial Wars, Military Order of the World War, and others. His war record began 26 years ago and subsequently included service on the Mexican border. In France he became chief of staff of the Yankee Division. He won the Distinguished Service Cross.

Ed Parker sent me the following information regarding the son of Freeman A. Cobb. "Dexter W. Cobb of Wilmington, Del., who is a grandson of Mr. and Mrs. Dexter H. Byam of 819 North Main Street, sailed recently for India, where for the next four years he will be in the employ of the Standard Oil Company of New York in their office there. He is a lubrication engineer and a graduate of the University of New Mexico."

The Geological Society of America held a semicentennial meeting at the Waldorf-Astoria Hotel in New York City, from December 28 to December 30. Robert B. Sosman was a member of a committee involved in preparations for this meeting. The Franklin Institute of Philadelphia has announced Sosman's appointment to membership in its Bartol Research Foundation committee. This action was taken by the board of managers of the Franklin Institute at the September meeting.

The Bartol Research Foundation was organized in 1921 upon the receipt of a bequest made in 1918 by Henry W. Bartol, a member of the Franklin Institute, who died in that year. Mr. Bartol left an adequate sum for the maintenance of research in the physical sciences, especially in electricity and in problems of a

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scientific character growing out of industry. The buildings which house this important research foundation are located on attractive grounds leased from Swarthmore College and contain all modern equipment to accommodate approximately 20 research workers. The new laboratory was opened in May, 1929, and since that time has held a reputation for being one of the outstanding laboratories of research in the country. The most notable work has been done in cosmic radiations and atomic structure. It was in this laboratory that the instruments were developed for use in the stratosphere flights made by the United States government and other organizations during the last five years. The director is Dr. W. F. G. Swann.

The appointment of Dr. Sosman is a particularly agreeable one. He is connected with the United States Steel Corporation and has been physical chemist in their research laboratory at Kearny, N.J., for many years. He is a graduate of Ohio State University as well as of M.I.T., and in addition to his S.B. he received his Ph.D. from Tech in 1907. During the War, he was consulting chemist of the ordnance department of the United States Army. Sosman is a member of many learned societies, in which he has held administrative positions of importance. He is also the author of many interesting and important scientific papers. He resides in Westfield, N.J.

Emma J. Fellows, wife of Otis Dwight Fellows of 142 Homer Street, Newton Center, Mass., and prominent in the affairs of the Newton Center Women's Club, died on December 17 at the New England Deaconess Hospital after an illness of eight weeks. Mrs. Fellows was born in Houghton, Mich., daughter of the late Edward P. and Ellen M. Penberthy. She had been a resident of Newton Center since 1926. She is survived by her husband; two daughters, Alice M. Fellows of Newton Center and Mrs. Richard S. Williams of New York; and four brothers. Her funeral services were held at her home on December 19. The sympathy of the Class goes out in full measure to our classmate in his loss.

Under date of February 15, Bill Evans wrote me the following letter from his present address, Aerofin Corporation, 918 United Artists Building, Detroit, Mich.: "I had the sad experience last Friday of viewing the remains of our fine classmate, Ernest L. Clifford. I must emphasize the word 'fine,' for I have found him just that in the few months of renewed friendship here in Detroit since the first of July. Genuine is a better word to express what Clifford must have meant to those who had the privilege of meeting him and enjoying his personality. He was genuine, refreshing to be with. He never tired one no matter how often or how long the contact. Although our association in school was only casual and since then in New York only an occasional business contact, he lent himself sincerely to making things pleasant for me, a stranger in Detroit. Clifford had been district sales manager in Detroit for the Babcock and

1904 Continued

Wilcox Company for about five years. He was taken with a heart attack in his office on Monday, February 6, and died the next day at his home. Only the Tuesday evening previous he and I had been together at the local Tech dinner meeting. Clifford's family in Detroit included Mrs. Clifford and their daughter, Jane. His son, F. Ling Clifford, is a student at the University of Michigan. He also had a married daughter, Mrs. A. G. Smith, living in Long Island. Everyone who knew Clifford will miss him."

At the time these notes were written, plans for the 35th anniversary reunion to be held in June were still in the formative stage, but if you have not yet received a preliminary notice, you will very shortly. — HENRY W. STEVENS, *Secretary*, 12 Garrison Street, Chestnut Hill, Mass. AMASA M. HOLCOMBE, *Assistant Secretary*, 4817 Woodway Lane, Northwest, Washington, D.C.

1905

The midwinter get-together of the Class was held at Carl's Duck Farm on the Newburyport Turnpike in Saugus, Mass., on Tuesday, February 7. Present were Young, Hadley, Stevenson, Gilman, Shapira, Marcy, Strickland, Boggs, Wentworth, Prescott, Buff, Donald, Barrier, and Goldthwait. Considerable time was spent in enjoyment of the duck, after which Young told of his experience last summer in traversing much of the Hudson Bay country by auto, canoe, and airplane. A semibusiness meeting resulted in the selection of Samuel Shapira for the nomination as class representative on the Alumni Council. Strickland, who has served in that capacity for several years, requested that the nomination be passed along to another. The committee appointed last June to consider the matter of a fund to underwrite the expenses of men otherwise unable to attend future reunions reported progress and asked for suggestions. After considerable discussion, the matter was re-referred to the committee to put the idea into form for presentation to the Class. Adjournment was made to the mariner's cabin (whoopie room) at the home of the Secretary in Melrose near by. Wentworth demonstrated his superiority at table tennis. Marcy and Prescott whacked shins in a game of Chinese hockey, a household adaptation of the old New England game of shinny. Milder members indulged in Chinese checkers and so on. Meeting definitely adjourned at an early hour, after one of our most enjoyable winter evenings.

Prepare when you read this to plan for your trip to Old Lyme, Conn., June 2, 3, and 4, for the 34th reunion. Arrangements will be much the same as in previous years except that the committee hopes to welcome a number of men who haven't yet been introduced to the hospitality, the beautiful surroundings, the fellowship of the Boxwood Manor '05 Dormitory.

Harold B. Harvey, VI, who entered '05 in our sophomore year, and who definitely asked at the time of his subscription to

the alumni athletic fund to be aligned with '05, as he spent most of his time with us, writes from Chicago, where he is president of the Harvey Metal Corporation. Since your Secretary commuted back and forth with Pete on the Boston and Maine for three years while at M.I.T., he can welcome this return of Pete to his first love. Harvey writes: "My first job was in Chicago and since then I have spent all my business time here with the exception of the time that it was necessary to spend in Washington under the N.R.A. and in New York on my two industry associations. For several years I have wanted to attend the 1905 meeting in June, but while I have been in New York at that time, matters came up which made it literally impossible for me to be there. I hope, however, that the practice will be continued and if there is a meeting this coming June, I am very much of a mind to put everything else aside in order to be there. The only fly in the ointment would be that the Aluminum Association, which takes in the Aluminum Company of America and the other large companies, has voted to have its summer session in Chicago the last week in June, and as western vice-president, I am in charge of the arrangements. It seems to me, however, that the 1905 meeting has always been in the early part of June, and if there is one this year, even though only a very few in number will be there, I will make every effort to attend." — Pete's note was written on the letterhead of the National Brass Forging Association, of which he is president.

Last month we gave a brief announcement of the death of George E. Turner at Redlands, Calif. Mrs. Turner, in thanking the Class for its expression of sympathy, sends us an extract from a letter from the War Department: "George E. Turner was born in St. Louis, January 30, 1882, son of Major General John W. Turner and Blanche Sonlard Turner. He was graduated from the Western Military Academy and was commissioned second lieutenant in the Illinois National Guard in 1900. He studied at the M.I.T. and was a member of Phi Beta Epsilon fraternity. He received a B.S. from the U. S. Military Academy in 1905, and was commissioned a second lieutenant of Infantry and served with the branch at Fort Crook, Neb., and in the Philippine Islands. Transferring to the Coast Artillery Corps in 1907, he was on duty with the Coast Artillery at the Presidio of San Francisco, Calif., and in the Hawaiian Department, and in June, 1911, was detailed as professor of military science and tactics at the Kamehameha Schools, Honolulu, serving on that detail until his return to the United States the latter part of 1913. He then served with the Coast Artillery at Fort Preble, Maine, as a student at the Coast Artillery School, Fort Monroe, Va., and as instructor at Citizens Military Training Camps at Camp Leon Springs, Texas, and Fort Monroe, Va. During the World War, he held the temporary ranks of major, Field Artillery, National Army, and Lieutenant Colonel, Field Artillery, United States Army. He was on duty as

Ordnance Officer, 84th Division, serving with that organization in the United States and France, and while in France, participated in the occupation of a Defensive Sector. The remainder of his active-duty service included a detail as professor of military tactics and science at the Virginia Polytechnic Institute, Blacksburg, Va., and duty with the Reserve Officers Training Corps at Fort Monroe, Va. Due to disability, Colonel Turner was retired on July 1, 1920, with the rank of major, and on June 21, 1930, he was advanced to the rank of Lieutenant Colonel on the retired list. Colonel Turner married Edith Brown, daughter of Colonel Edward T. Brown, 5th Field Artillery, in 1908 and their children are George E. Turner, Jr., Edith Turner, and Edward B. Turner."

From a book published by the Civic Committee of Redlands, Calif., we have the following: "Many civic organizations are grateful for the fact that Lieutenant Colonel George E. Turner came to Redlands after concluding an interesting career in the United States Army. Retiring from the army in 1921 because of ill health, Colonel Turner purchased a Redlands orange grove and plunged into numerous civic endeavors. He was instrumental in reorganization of the Arrowhead Council, Boy Scouts of America, and in the establishment of a permanent scout camp at Barton Flats. For several years he was scout commissioner. On many civic committees and boards, Colonel Turner also has been director of the American Red Cross in Redlands, executive committeeman of the American Legion, and president of the Country Club. For more than fifteen years he was director and president of the Humane Society. Colonel Turner died November 10, 1938."

The Secretary is unable to find any up-to-date addresses for George H. Davis and Bartolette A. Yoder. Can any classmate furnish these or any information about these men? The following new addresses reach us: James N. Gladding, 2501 Rogers Avenue, Fort Worth, Texas; Carl A. Houck, 78 Woodcrest Road, Kenmore, N.Y.; Leon M. Pease, 5293 Delongpie Street, Hollywood, Calif.; Captain Julius Furer, Bureau of Construction and Repair, Navy Department, Washington, D.C. — FRED W. GOLDTHWAIT, *Secretary*, 274 Franklin Street, Boston, Mass. SIDNEY T. STRICKLAND, *Assistant Secretary*, 75 State Street, Boston, Mass.

1906

The Chicago *Tribune* of November 26 advised that Ralph H. Burke, I, who has been chief engineer of the Chicago park district, had been named chief engineer for the city department of subways and traction. Additional information from the *Tribune* reads as follows: "Burke has obtained leave of absence from the park district to take over the new work. His salary will be \$15,000 a year. The department was authorized by the city council three weeks ago to build and supervise the operation of Chicago sub-

You will find on page 1 information on Alumni Day, June 5

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ways. Philip Harrington is commissioner of the department. Burke will be in direct charge of the actual subway building, Harrington said. This work is scheduled to begin by December 15. Burke is a graduate of the Massachusetts Institute of Technology. He has had broad experience with the sanitary district in heavy tunnel construction in Chicago."

At the midwinter convention of the American Institute of Electrical Engineers held in New York on January 24, B. W. Kendall, VIII, and H. A. Affel '14, both of the Bell Telephone Laboratories, presented a paper on the new 12-channel carrier telephone system for open wire lines. With this carrier system, plus existing devices, a single pair of telephone wires may now carry as many as 16 simultaneous telephone conversations.

The Secretary is indebted to Charlie Kasson for a revised copy of his original pamphlet on "Matter, Energy and Electricity," published in 1929. Charles is now residing in a fine old New England homestead on Newton Road, Plaistow, N.H., and would be glad to welcome any classmates who happen to be in that vicinity.

To date we have not heard very much about the annual Florida exodus, except that a few weeks ago we received a note from Henry Ginsburg advising that he and his wife expected to start over the road about February 10. Incidentally, the note also included a picture of our classmate Ralph Patch, clipped from the *Boston Herald*. The occasion for the photograph was the fact that Ralph had been appointed chairman of a committee to raise \$58,000 for the New England Sanitarium and Hospital of Stoneham, which indicates that Ralph is continuing his good works. The North Station, Boston, was modernized a few years ago, and, as a result, several exhibit windows are available which are usually devoted to some products of New England industries. About once a year the E. L. Patch Company of Stoneham uses one of the windows. Their last exhibit featured their Nepto lotion, which is good for chapped hands. On seeing this, the Secretary assumes that it is about time for Ralph Patch to start for Florida, although we have no definite news of his departure to date.

We are in receipt of a request from Harold B. Harvey, VI, who has been listed with us since graduation, to have his class affiliation changed to 1905. We regret losing the name from our rolls but, after all, our organization is purely voluntary and, therefore, we will comply with his request.

In our notes in the February Review we mentioned the passing of three more of our classmates, namely, Allen Ashley, Fred S. Phelps, and Julian M. Wright. The Secretary has since received a copy of the *Columbia Steel Employees' News* dated November 1. Under the heading "Official Dies," it contained the following reference to Phelps: "Frederick S. Phelps, 55, general superintendent of the Pacific Works of Columbia Steel Com-

pany, died Monday night, October 17th, at St. Vincent's Hospital, Portland, Oregon. Phelps was stricken with a heart attack three weeks ago while on a business trip to that city. Thirty-two years of service with the subsidiaries of United States Steel Corporation mark Phelps' career. He was born in Andover, Massachusetts, in 1883 and attended the public schools there. Technical training was received at the Massachusetts Institute of Technology. After graduation Phelps joined the American Steel and Wire Company in 1906 and entered the district engineer's office at the Worcester, Massachusetts, Works. In 1908 he became assistant superintendent of the wire rope mill. Phelps was transferred in a like capacity to the Pacific Works of the American Steel and Wire Company in San Francisco in 1910. Five years later he was made superintendent. Shortly after the acquisition of Columbia Steel Company by United States Steel Corporation in 1930, Pacific Works became a part of the new company with Phelps in charge as general superintendent. Phelps made his residence in Sausalito, California, and is survived by his widow, Bertha. There are no children."

Further reference to Wright's death was contained in a clipping taken from the Paris edition of the *New York Herald*, dated October 8: "Word was received in Paris yesterday of the death on Thursday of Julian May Wright, former resident of Paris and member of the Mixed Court of Cairo, Egypt, at Berck Plage, where he had gone for treatment. Burial will take place at Berck Plage. From 1920 to 1930, Mr. Wright was a member of the Paris law firm of Wright and Hill. In 1930 he was named a member of the Mixed Court of Cairo and had remained there since. He was born in Douglaston, L.I., on February 12, 1884, and was educated at Massachusetts Institute of Technology. He was a marine architect before taking up law. He leaves his wife, the former Almeida Santo, of Lisbon; his daughter, Carol Francis Wright, and his mother, Mrs. Carolyn Kane Wright."

Readers of the February Review may have noted under the deaths that of Paul B. Webber, II. Below is the obituary, taken from the *Boston Herald* of December 26: "Paul Baron Webber, 54, connected with the treasurer's department of the New England Power Company for the past 15 years and a lifelong resident of this town [Bedford, Mass.], died today at his home on Hillside avenue from a heart attack. Mr. Webber, who had been associated with Massachusetts utility companies since his graduation from Massachusetts Institute of Technology in 1906, was the son of the late Wallace G. Webber, one of the original partners of Paine, Webber & Company, Boston bankers. He was a former treasurer of the Massachusetts Utilities Associates, a trustee of the Lexington Savings Bank, and a member of the Concord Country Club and the Lexington Golf Club. Mr. Webber is survived by his widow, Mrs. Marion (Scott) Webber; a son, Paul B. Webber, Jr., of Bedford; a daughter, Miss

Marcia Scott Webber, also of Bedford; a brother, Lewis G. Webber of Bedford and a sister, Mrs. Carolyn Bixby of Watertown." — Thanks are due Sam Nash for this information.

The month of January marked the passing of another classmate, Charles Wetterer, VI, whose death occurred in Melrose, Mass., on Tuesday, January 24, after a long illness. The following notice was taken from the *Boston Herald* of January 26: "Funeral services for Charles F. W. Wetterer, 54, vice-president of Stone & Webster Service Corporation and director of many Southern utility companies, will be held today at 2 p.m. at Trinity Episcopal Church, West Emerson street, Melrose. Mr. Wetterer died Tuesday night at his home, 64 Prospect street, Melrose. Born in Gloucester, he was educated in the Gloucester schools and was graduated from Massachusetts Institute of Technology in 1906 with an S.B. degree in electrical engineering. After his graduation he became associated with Stone & Webster, remaining with the firm until his death. He had been manager of the Tampa Electric Company, Tampa, Fla., and was also connected with the public utility management in Texas. He was a director of the Southern Ice Company, Tampa Electric Company, North Texas Company, Houston Electric Company, Galveston Electric Company, Fort Worth Transit Company, Galveston-Houston Electric Railway Company, Texas Bus Lines and Texas Motorcoaches, Inc. He also held membership in the Bankers Club of New York and the Bear Hill Golf Club, Wakefield. Besides his widow, Mrs. Elizabeth Paten Wetterer, he leaves a son, Charles Stanley Wetterer."

All 1906 men will remember Charlie Wetterer. From his first days as a freshman his keen mind, energy, sense of humor, and qualities of leadership made him one of the outstanding class members. In freshman drill he was captain of one of the companies and later became commanding officer of the regiment. During his four years' course he held numerous class offices and in 1905 was business manager of the 1906 "Technique." He performed an outstanding job in this assignment by closing the publication without a deficit, which was quite unusual in those days. In his senior year his high scholarship enabled him to take a position with Stone and Webster at midyears which he carried on during his last term at the Institute. He was married to Miss Elizabeth Paten at the time of our commencement and sailed for Texas immediately upon graduation. His whole business career was with the utility management branch of Stone and Webster, occupying positions in Texas and Florida for nearly ten years and then being recalled to the Boston office. At that time he was made class secretary, the present Secretary being named assistant. About 1917, the offices of the management association of Stone and Webster were transferred to New York, and Wetterer thereafter spent all his business time in New York but maintained a residence in Melrose. On his transfer to New York he resigned as class

1906 Continued

secretary, the duties falling upon the present incumbent. In New York, he lived at the Hotel Roosevelt. The same characteristics which made him a leader in the Class asserted themselves in his business career, and at the time of his death he was vice-president in the management's association. Charlie was always an enthusiastic Tech man, a loyal class member, and was very helpful to the Secretary by his interest in class affairs. His son, C. S. Wetterer, is now a senior at the Institute. The Class was represented at the funeral services by Ned and Mrs. Rowe, Ralph Patch, Howard Shaw, Fred Batchelder, Sherman Chase, and the Secretary. A floral tribute was sent in behalf of the Class. To the Secretary, the Class without Charlie Wetterer can never be quite as it was before his passing. — JAMES W. KIDDER, *Secretary*, Room 802, 50 Oliver Street, Boston, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills, Mass.

1907

Nineteen '07 men gathered for dinner and an evening of good-fellowship at the Silver Room at Walker Memorial, Cambridge, on January 23. Our classmate, Ed Moreland, Tech's Dean of Engineering, told most entertainingly and instructively of his experiences and impressions while an expert witness on the stand for three and a half days last November at the Washington hearings before a Congressional committee regarding T.V.A. costs and relations with the private utility companies. The Secretary read several letters and told of numerous facts relative to classmates. In addition to Ed and the Secretary, the following men were present: Lawrie Allen, Dick Ashenden, Clinton Barker, Percy Colvin, George Crane, Bill Coffin, S. J. Egan, Tom Gould, Ed Lee, Milton MacGregor, Peabo Peabody, Ed Prouty, Bob Rand, Don Robbins, Gilbert Small, Oscar Starkweather, and Harold Wonson.

The Boston *Herald* of February 4 contained a news item telling of the death of Ruth M. Bancroft of 17 Leonard Avenue, Newtonville, Mass. She was the wife of Albert F. Bancroft of undergraduate Tech Show fame and of present prominence as a successful manufacturer of women's shoes. Besides her husband, she leaves a daughter, Mrs. Richard B. (Marjorie) Dort of Auburndale, Mass., and two sisters. The Secretary wrote Bert a note expressing personal and class sympathy.

In the real estate section of the Boston *Herald* of Sunday, February 5, was a picture of the very attractive-looking house at 409 Highland Street, Newtonville, Mass., recently purchased by Gardner S. Gould and his wife. — In the *Herald* of February 14, an item telling of the town elections in Yarmouth, Mass., stated that William L. Woodward defeated four other candidates in the race for membership on the school board. This must be our own Bill. We wish it were possible to know how many '07 men hold public office in the communities in which they live. If all towns and cities could have officials like Bill Woodward, and Dick Ashenden, who

is an alderman in the city of Newton, Mass., and Leon Allen, who is town accountant in Brookline, Mass. (of whom we happen to know offhand), what an improvement would come in the quality of local government!

Early in February, Phil Walker thoughtfully sent us a clipping from a Worcester, Mass., paper containing several photographs and telling at length of a dance at the Tatnuck Country Club when Charlie Allen's daughter, Penelope, made her formal debut, jointly with another girl, on December 27. The photograph of Miss Allen depicts a most wholesome, attractive-looking young lady. — Through the courtesy of Don Robbins, we have a portion of a page from the January number of *Industrial Canada*. It bears a cut showing our classmate, Clarence D. Howe, minister of transport for Canada, driving the last spike at the ceremony of the recent opening of the Senneterre-Rovyn branch of the Canadian National Railways, which will serve the rich gold field area of western Quebec. — Harold S. Wilkins, II, now a major in the regular Army, is stationed at Picatinny Arsenal, Dover, N.J.

In the 1936 edition of "Who's Who in Commerce and Industry" appear the names of four '07 men: Jim Barker, Vice-President of Sears, Roebuck and Company, Chicago; Frank Shields, Treasurer of the Barbasol Company, Indianapolis, Ind.; John Evans, President of the First National Bank of Denver, Colo.; and Fred Moses, President of several mutual fire insurance companies at Providence, R.I. — In the 1938 edition of "Who's Who in New England" 17 '07 names are to be found: Henry Alvord, head of the civil engineering department at Northeastern University, Boston; Dick Ashenden, President of the Boston Nickel Plating Company and L. L. Rowe Company; Bert Bancroft (previously mentioned in these notes); Fred Banfield, works manager, Whitin Machine Works, Whitinsville, Mass.; Leon Chaffee, physics professor at Harvard; Bill Coffin, architect, Boston; George Crane and Ed Temple, contractors, as Temple and Crane, Inc., Boston; Hud Hastings, Yale professor; Ralph Hudson, M.I.T. Professor; Bert Kendall, architect, Boston; Alexander Macomber, consulting engineer, Boston; Ed Moreland (previously mentioned in these notes); Maurice Pease (see the March Review); Bill Perry, architect, Boston; Phelps Swett, professor at Middlebury College and President of the Middlebury, Vt., National Bank; Harold Wonson, comptroller, Commonwealth Shoe and Leather Company, Whitman, Mass. — Our congratulations to all these men, who honor not only themselves and their families but also their Class and Technology.

And now, in closing, we have another letter, this time from faraway India, written by B. C. Gupta on letterhead of the Indian Iron and Steel Company, Ltd., Hiranpur Works, Burnpur Post Office, via Asansol, E.I.Ry., India, and dated December 21: "Your letter dated 30th October, after a bit of meandering, reached me at

the above address. You addressed the letter to Ramna, India, which is an extremely broad address in a country two-thirds the size of the U.S.A., with a population of about four hundred millions of people. Ramna is only a part of Dacca, where I was until recently. After spending 19 years at the Bengal Engineering College as professor of electrical engineering, bluffing myself into believing that I knew something about electrical engineering, I was appointed principal of the Dacca Engineering College in 1931, where I spent seven very happy years. On my retirement from government service on superannuation after having been given four extensions, I have come to the Indian Iron and Steel Company, Ltd., as chief town administrator. This company has been manufacturing pig iron for over 70 years, but recently under the same management the Steel Corporation of Bengal is springing up and the Indian Standard Wagon Company, also. My town administration work covers two iron works — one at Hirapur and the other at Kulti, 11 miles apart — the Steel Corporation of Bengal, and the Indian Standard Wagon Company. At the present moment there are about 17,000 workmen in the labor force of these companies, but by the time the new Steel Corporation of Bengal comes into operation, I am inclined to think that there will be over 25,000 workers in the place. My jurisdiction covers all departments outside the workshops, viz., 25 departments at Hirapur, 16 at Kulti, and eight at Santa (Standard Wagon Company).

"I was 57 years old day before yesterday, but since I took up this job in this exceptionally fine climate, I find that I am as energetic and lively as I was when I skipped around dear old Tech in 1907. I still play a very hard and keen game of tennis and am keeping up my dancing in the same way as we used to do in the junior proms. I am returning the statistics, duly filled in, with this letter.

"If any of the lads are thinking of trekking to India, Asansol is the railway station for this company, being on the main line between Bombay and Calcutta, which is only 140 miles by road. We often drop into Calcutta by car to see friends. We have several big highways in the country for excellent motoring, which is one of our joys during the holidays. Best regards to Tech '07."

In order to give you readers the whole picture concerning Gupta, he worked in the drafting office of British Thomson Houston Company, at Rugby, England, from 1907 until early in 1908, when he became electrical engineer for the Jhelum Power Installation at Kashmir, India, and remained there until January 28, 1913. It was then that he began the period of teaching at Bengal Engineering College to which he refers in his letter. He has done important engineering work in India, has designed several pieces of equipment of great value in the silk industry, has been a member and officer in many professional societies. He has given several hundred lectures and addresses all over India and in the United States,

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which he visited in 1923 and 1924. Birendra married a girl from Lynn, Mass., in 1909, and there are three daughters, now 28, 25, and 22 years old. — BRYANT NICHOLS, *Secretary*, 126 Charles Street, Auburndale, Mass. HAROLD S. WILSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1909

Thirtieth reunion, Oyster Harbors Club, June 3 to 5. — From far-off China comes a letter from Arthur Knipp, who has been teaching at Lingnan University, Canton. The letter is so interesting that I quote it in full: "I was very glad to receive your letter of October 19 and to know of your interest in what is happening in South China. Since I have not had any very unusual experiences, what I write may not be of great interest. . . . Use just as little or as much as you wish . . . in The Review. Perhaps you may wish to summarize what may be of most interest.

"My wife and I had our tickets all arranged for returning via Europe and Suez. However, when we learned of the intensive aerial bombing of Canton during the latter part of May and the early part of June, we were able to cancel our European trip, and instead we motored to the West Coast and rented an apartment in San Leandro, just outside of Oakland. My wife and young daughter are still there. They had rather expected to come via Honolulu during the middle of November, but I cabled them not to come when the Japanese invasion materialized. I myself sailed from Vancouver in the early part of September.

"I found things fairly normal here when I arrived about September 23. The Chinese did not expect an invasion, for our fall enrollment was more than 600 — this was larger than in any preceding year. There had been little bombing during August, and foreign women and children were returning to Canton. There was some bombing during late September and early October. At first I did not like the feeling of having Japanese planes fly over our campus, but we did not feel any special danger, for we felt sure that points in the far-distant western part of the city were the main objective of the Japanese. However, one bomb hit a junk just about half a mile from our Lingnan pier. The Chinese in Canton were surprisingly calm even during a bombing.

"In late September the general impression among both Chinese and foreigners was that the Japanese would not invade the South, except in the event of a European war. I went to Hong Kong on October 11. The next day at noon the newspapers reported a Japanese landing near Bias Bay. On the 13th I returned to Canton on the S.S. *Kinsan*, and this proved to be the last trip of a British steamer from Hong Kong to Canton. When I returned to the campus, I found that college had been suspended, the students were making plans to leave, and the Chinese staff — with only a couple exceptions — and their families were being advised to leave just as soon as possible.

"In 1927 the New York board of trustees of Lingnan handed control over to a Chinese board of directors. As soon as the invasion started, this Chinese board voted to have the institution revert to American control, and a formal transfer was made. As soon as this was done, American flags were put up at various places around the border of the campus (our property comprises more than 500 acres). An American radioman from the U.S.S. *Mindanao* was stationed here, and by means of our short-wave transmitter he kept in constant touch with the gunboat. We have our own power plant and water-supply system, and at first we thought we might have to operate these ourselves, but the Chinese mechanics stayed on and have been here all the time. Also we thought at first that artillery firing might take place from one side of our campus toward the city; that fortunately proved not to be the case. The five or six American ladies still on the campus were advised by the consul to go to Shameen, the British concession in Canton, and they did so, but they were back again within a few days.

"Lingnan was designated as a refugee area, one of several in or near Canton, when the Japanese occupied the city. At first only women and children were admitted. It was pathetic to see them crowd in. They were so evidently grateful for having a place to which to come. Many had to camp outside the gates for days while space and adequate housing were being made ready for them. The number on the campus is now more than 7,000. Many of these pay something for their food.

"Fortunately we have been able to get an adequate supply of rice. Just now the Canton refugee committee is providing us with unhulled rice, and it is milled in our own mill, which is kept running nine hours a day. Some of these refugees are from towns 40 miles away. At first they came in fear of the Japanese. Now they are afraid also of being molested by bandits if they return to their villages. The rations provided for them without charge are very meager, enough to subsist on but not much more. It is hoped, of course, that soon many of them will leave in order to get something like normal employment.

"The city of Canton has suffered terribly. Fires have ravaged large business sections. For days the city was practically deserted. The people have started to come back, but only the poorer people, and this does not relieve the refugee problem, for there are no industries in operation and very little means of employment.

"Our reason for staying on the campus is only in part to provide a refuge for refugees. The primary reason is to conserve the campus and buildings as an educational center. Without American ownership and without Americans being here, the whole plant would undoubtedly have been occupied by the Japanese. Very quickly they occupied and are making use of Western-style houses owned by Chinese civilians just a short distance outside our campus.

"The Japanese in occupying Canton have acted with moderation compared with their actions in Nanking. Probably that is due to Canton having been captured so easily. The American doctors report many mistreatments of civilians, particularly of Chinese women, but perhaps that is fairly general in the case of war. What the Japanese have gained thus far, other than stopping the transport of munitions and supplies from Hong Kong along the Kowloon-Canton and Canton-Hankow railways, is difficult to see. As long as the well-to-do Chinese stay away from Canton — just now most of them have taken up residence in Hong Kong — the Japanese will be unable to make capital out of the occupation. Perhaps they expect to retain a foothold here for commercial advantage when some sort of peace is made. Whether they will get much out of the Cantonese along this line remains a question. Of course the British in Hong Kong are being hit hard by their inability to carry on trade with Canton and through Canton with the interior of China. British opinion in Hong Kong seems to be that it was the surrender to Hitler in Europe which let the Japanese see that they might invade South China without hindrance from Britain. At first it was thought that the Japanese would use Kwangtung as a military base with which to attack Kwangsi and West China, but thus far they do not seem to have made much progress to the north and west of Canton.

"Lingnan is still functioning, with the Chinese staff, assisted by several American teachers of English, carrying on classes in the late afternoon and evening in the classrooms of the University of Hong Kong in Hong Kong. The enrollment there is about 550, just about 90 per cent of what the enrollment was here in September. This arrangement will be continued during the spring semester. It is too early to know what will happen after that.

"As far as the more essential comforts and conveniences are concerned, things have been surprisingly normal for Americans staying on the campus. Children are returning here, just as English children are returning to Shameen. For what seemed a long time though, we received no mail at all. The only news from the outside world came over the radio. Fortunately I brought back our 11-tube Philco and get regular reception from Daventry with it. Short-wave reception from Europe is much better here than I found it to be last winter in Baltimore. Occasionally W3XL and W8XK come in clearly, but only with some flutter and unevenness. Our best way of getting mail out is still to send it by someone going to Hong Kong on a British or an American gunboat. The *Mindanao* goes tomorrow, and a fellow staff member will mail this there.

"Kindly remember me especially to R. L. Jones and also to Southgate and Whitaker, all of Course VI, if you have an opportunity to do so. The two latter I have not seen for quite a long time. This letter is longer than I had expected

1909 Continued

it would be. Perhaps a sentence here or there will be usable to you. With all good wishes. . . ."

Jim Critchett, Vice-President of the Union Carbide and Carbon Research Laboratories, is a member of the welding research committee of the Engineering Foundation, which will undertake a \$100,000 program of welding research during 1939. — Charlie Belden, the air-minded dude rancher of Pitchfork, Wyo., has announced that he has made arrangements to deliver two antelopes by airplane to a London zoo next summer. — Among the February brides was Miss Rosamond Esselen, daughter of Dr. and Mrs. Gustavus J. Esselen (Henrietta Locke) of Swampscott, Mass. The groom was Bradford K. Bachrach.

At the 62d annual convention of the American Paper and Pulp Association, held in New York in February, it was announced that J. Newell Stephenson, editor of the *Pulp and Paper Magazine of Canada*, was the winner of the gold medal of the Technical Association of the Pulp and Paper Industry, one of the affiliated organizations of the association. — The February number of *American Business*, under the title of "School Teachers Who Made the Grade in Business," says: "Technical and engineering schools seem to furnish a number of men heading big companies, some of which came to business via the teacher's platform. Another technical school graduate is George Edward Wallis, president of the Creamery Package Manufacturing Company. Mr. Wallis is an easterner, who came to the Middle West and liked it. He was born Beverly, Massachusetts, won his B.S. degree at Massachusetts Institute of Technology; after a term as instructor at the University of Michigan he began a business career with the Creamery Package Company in 1916, which company he now heads as president"

Paul Wiswall writes: "A few days ago I went to a dinner here in New York where 72 college presidents were the guests of the club where the dinner was held. Dr. Compton was there, and I had a chance to see him for a minute as we were taking our places. During the dinner, the toastmaster remarked that he was glad to see down the long table his friend Dr. Compton of the Massachusetts Institute of Technology. In fact, he was reminded of the story told by a young friend who was a freshman at Hobart College, Geneva, N.Y. A rather pompous gentleman one day sat on the platform at morning chapel and was asked to speak to the boys. He had something of the stuffed shirt in his make-up and began an effort to make a hit with his audience by dilating on the initials of the word 'Hobart.' H stood for honor, O for obedience, and so on. But by the time he had droned on as far as R, the young freshman leaned over to his neighbor to whisper: 'Say, I am glad my father did not send me to the M-a-s-s-a-c-h-u-s-e-t-t-s I-n-s-t-i-t-u-t-e o-f T-e-c-h-n-o-l-o-g-y!'"

"Doc Bush '16 was there, though as a member of the club rather than as president of the Carnegie Institution. I saw

him for a half hour before the dinner. Now I do not know Dr. Bush very well — I have seen him only a few times — yet he is a man with whom you need no formalities, and I had a grand time with him. I asked him about the Carnegie Institution, telling him that all I knew of it was that there used to be a bronze, non-magnetic yacht called the *Carnegie* [see *The Review*, February, page 188], and that its mission was to serve as a laboratory to study terrestrial magnetism. He told me that the *Carnegie* met with a mishap and was no more, but that the Institution had a laboratory at Cold Spring Harbor, Long Island, another at Baltimore, still another at Palo Alto, and that he was greatly interested in some work they were doing among the Mayan monuments in Yucatán. He said he thought that his presence would be sorely needed down there this winter; he just must go down to see that everything was going well, and winter was the time to go. His family was well settled in a Washington hotel, the children were in school, and now the trip to Mexico would finish off the winter with a grand flourish. I hope as I write this to you he is indeed in a warmer place than latitude 40 north." — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass. *Assistant Secretaries*: PAUL M. WISWALL, MAURICE R. SCHARFF, New York; GEORGE E. WALLIS, Chicago.

1910

Your Secretary has been rather negligent with his notes for the last three issues, but his excuse may be attributed to the hurricane of last September. The Department of Public Works of Massachusetts called in many firms of engineers to assist in the emergency in the design of bridges. Ralph Horne and your Secretary are members of firms who were selected for this work. — J. Theodore Whitney is the author of an article on welding applications in the new Massachusetts General Hospital Building published in the January issue of the *Journal* of the Boston Society of Civil Engineers. Ted is the recognized authority in Boston on welding of structural frames for buildings. — Dean Peabody was the speaker at the designers' section of the Boston Society of Civil Engineers on March 8. He spoke on the design of flat slab floors of unequal spans.

Charles Greene gave a talk on the mechanical equipment in refuse incinerators before the sanitary section of the Boston Society of Civil Engineers at its annual meeting on March 1. — John Gray has been commissioned as architect for one of the housing developments in Boston. — Roger F. Hill, who was formerly with the Palmer-Bee Company in Detroit, is now located with Pope and Cottle of Boston, and he is living in Belmont, Mass. — HERBERT S. CLEVERDON, *Secretary*, 46 Cornhill, Boston, Mass.

1911

Just as Paul Kellogg's newsy letter pleased me immensely when received in time for inclusion in the March class

notes, so it was a joy in mid-February to receive a splendid letter from good old Joe Gershbberg, VI. You remember that Fred Daniels, VI — who, by the way, was reelected president of the Riley Stoker Corporation at the February annual meeting here in the heart of the Commonwealth of Massachusetts — told me of running into Joe at an American Society of Mechanical Engineers' meeting in New York last December. Learning that he was located with Brooklyn Edison Company, Inc., 1 Hudson Avenue, Brooklyn, N.Y., I wrote to him and here is the grand result: "It was indeed a pleasant surprise to hear from you, Dennie, and your request is indeed reasonable. Yes, a great many things may happen in one's life during a period of over a quarter of a century, but in giving an account of myself I shan't annoy you with too many details. To make a long story short, I submit the following brief review.

"Although a Course VI man, I practiced electrical engineering for a comparatively short time at two widely separated intervals, at first as a tester for one year with the General Electric Company at Lynn, after my junior year at Tech, and later (1922-1924) as an electrical engineer with the New York Central Railroad in New York City. In the main, my experience has been along mechanical lines of such a character as to enable me to study power-plant engineering from three points of view: (1) as a technical designer of steam turbines (six years with the G.E. and three years with the Terry Steam Turbine Company); (2) as a designer and constructor of steam power plants for one year, mostly with the late John A. Stevens, consulting engineer, Lowell, Mass.; (3) as a test engineer with a power utility (New York Edison system) which I joined exactly 15 years ago today (February 16). The latter position kept me in intimate contact with the latest developments in power-station practice, such as use of pulverized fuel for steam generation, employment of boilers, steam turbines, and condensers of large capacity for more economical production of electrical power. I had the distinction of planning and conducting acceptance tests of the first two large turbogenerators, each of 160,000-kilowatt capacity, that had ever been built, as well as of mammoth boilers of over one million pounds per hour evaporation. A great deal of testing being done in conjunction with technical studies, investigations, and research for the improvement of station operation, I spent most of my time at the large Hell Gate station. Last April I was transferred to the Hudson Avenue station of the Brooklyn Edison Company, which is the largest power station in the Consolidated Edison Company system. My present title is division engineer in the recently formed technical service department, which puts me in charge of 18 men.

"I have contributed to the technical literature both as an author and as a discussor and have participated in the revision of several A.S.M.E. power-test codes. Fred Daniels and I met at one of

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the sessions of the A.S.M.E.'s last annual meeting at which, as a coauthor, I presented a report on study of combustion in one of the stokers at the Hell Gate station. This study revolutionizes the old conception of how coal is burned in an underfeed stoker.

"In 1920 I married Josephine Elizabeth Regan. We have only one child, a son, Danny, born in Hartford, Conn. He graduates from high school this spring. He intends to take up engineering but would like to specialize in physics, his favorite subject. He is my partner in the golf games, at which I am not his equal by a long shot. While his score is in the low 80's, for which he won a letter on his high school team, I am still a dub. Well, I feel I have said more than enough about myself. Will close with personal regards to you and beg you to convey the same to my classmates." — Surely a most interesting career to date, Joe, and good luck to Danny in his collegiate and ultimate career and to you and Mrs. Gersberg in your continued happiness and prosperity.

Earlier in the month a nice letter was received from Harry Tisdale, V, American Dyewood Company, 22 East 40th Street, New York City, advising that "business is picking up again with us, and January sales are ahead of December." He also tells of having heard that Joe Harrington, VI, has finally been granted a patent originally filed in 1930 on a process for making esters, on which he has been fighting interference action since 1934. I have written Joe for details and will report later after I hear from him. Continuing, Harry said: "You have probably read about the new synthetic fiber produced by du Pont and called nylon. A good part of my time the last month has been spent in investigating the dyeing properties of this product as regards logwood. Am pleased to state that it can be dyed with logwood. While nylon is supposed to compete with real silk, we find that the wool formulas for logwood work better than the usual silk formulas. I understand one fishline manufacturer has already made some fishlines out of nylon, so the battle is on, and it does not look so good for real silk, but time alone will tell. Speaking of time — June, 1941 — that will mean 30 years out! A 30-year reunion! Where to? Has anybody mentioned the subject yet?" — To you, Harry, goes the credit for first mentioning the subject of our next reunion since our highly successful 25-year event at Mayflower Inn. But, naturally, Jack and I have had it in the back of our heads and plans will get under way in due season.

Here is an interesting romance with an M.I.T. background — the engagement of the daughter of a 1913 man whom many of us know to the son of a 1911 man. Witness the following Dedham, Mass., newspaper item: "Mr. and Mrs. Howard Pike Fessenden of Newton Center and Franklin, New Hampshire, have announced the engagement of their daughter, Miss Eleanor Ruth Fessenden, to Calvin Powell Eldred, 3rd, son of Mr. and Mrs. Calvin Powell Eldred of Ded-

ham. The announcement was made at a Christmas dinner and reception at their Newton Center home. Miss Fessenden attended the Erskine School and is a graduate of the Pierce Secretarial School. Mr. Eldred is a graduate of Governor Dummer Academy and of Dartmouth College, Class of 1937. He is with the Portland Division of the Socony-Vacuum Oil Company."

Another item along the same line concerns an '11 man and a relative of a famous 1885 Tech man, now deceased, Alex McKim, artist. An Associated Press story out of Boston, February 8, read: "John A. Proctor, 50, executive of a New York City light company, and Mrs. Gertrude Whiting McKim, 40, a New York City portrait painter, today obtained a marriage license here and a waiver of the five-day Massachusetts marriage law. Proctor told newspapermen they would be married later in the day and would sail next day for a European honeymoon."

Collegiate Digest, issued weekly as a rotogravure supplement to leading college newspapers, including the *Tech*, presents "national college news in picture and paragraph." In a late-February issue was a page titled, "Research Advances Science," and there in the upper right-hand corner appeared a lifelike snap of shirt-sleeved Alf deForest, XIII, busily engaged at a testing machine, the caption reading: "Salt Shaker Hews Safety Trail" and the paragraph: "In his laboratory at Massachusetts Institute of Technology, Prof. A. V. deForest uses a salt shaker in developing safety for travel by land, sea or air. He uses the shaker to spread carbon powder on magnetized steel to discover flaws in metals."

January releases from Nevada — Reno *Evening Gazette* and the *Mining Press* (bi-monthly) — show our Jim Greenan, III, to be further expanding his mining activities in that state. Read the welcome additional news: "Following comprehensive sampling by test crews, covering a wide area during several weeks and yielding satisfactory results, property known as the Dahl-Christensen placer, embracing approximately 5,000 acres and situated 18 miles southwest of Battle Mountain in Lander County, has been acquired by James O. Greenan, now operating extensively in Nevada and California and who maintains his home office in the First National Bank building in Reno. Discovered around 1910, this broad tract of placer ground, covering wide alluvial fans in the flat terrain below the outlets of Copper Canyon and adjacent canyons debouching from the Battle Mountain range, has produced considerably more than \$1,000,000 in gold, having been in that period the most consistently productive placer area in Nevada. Operated as an individual enterprise, the project will be known as the Greenan Placers. In his statement Mr. Greenan said that from the present outlook it seemed highly probable that a major-scale operation can be conducted over a long period of years and his plans were being formulated with this end in view. He and his associates are prepared to

expend substantial sums for development and equipment, the latter probably to include a dragline dredge of 150,000 cubic yards monthly capacity.

"Information concerning some of the other properties in which Mr. Greenan is interested follows: General Dredging Corporation, now operating two large-capacity dragline gold dredges near Folsom and San Andreas, California, is making combined production of approximately \$40,000 per month. The cyanide plant at Mill Canyon (see February class notes) milled over 1,000 tons during December — the largest monthly tonnage milled to date. The cinnabar (ore of mercury) property acquired by Mr. Greenan and ex-Senator Tasker L. Oddie and situated near Paradise Valley, Montana, is responding to development work in a highly satisfactory manner. . . ." — Best of luck to you, Jim, in your rapidly expanding mining interests!

Time, February 20, had a cover portrait and interesting article about Charlie Edison '13 whom many of us remember as an active undergraduate during our last two years at Tech. We are proud that a contemporary has become such a vital factor in shaping the destinies of our country as has this capable Assistant Secretary of the Navy. — Answering an inquiry from me when an address change was received, O. H. Shenstone, I, writes: "I do not feel there is any particular news story in my return to Toronto, but the circumstances are as follows: I went over to Racine, Wis., as general manager of the Massey-Harris Company, which is the United States subsidiary of Massey-Harris Company, Ltd., of Toronto, manufacturers of farm implements since 1847. I returned to Toronto the first of January last to organize a new research department here in Toronto and this work is now occupying all of my attention." Another new address received shows that George Kenney, II, has advanced from captain to major in the United States Air Corps and should now be addressed at Mitchel Field, Hempstead, Long Island, N.Y.

Once again you have concrete evidence of the value of letters from classmates in the writing of class notes. Why don't you write that letter you have been planning to write — and write it *now*. Be sure to make your plans to attend Alumni Day at the Institute, Monday, June 5, if at all possible. — ORVILLE B. DENISON, *Secretary*, Chamber of Commerce, Worcester, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1913

George H. Starr, I, will be remembered by his classmates as quite individual, and Twink hasn't changed in that respect in 25 years. George was kind enough to look up the Class Secretary in February, and we spent a pleasant evening talking over the old days. George is one of the few Civils who has followed the profession he studied. He has been field superintendent for Ferro Concrete Construction Company, Cincinnati, continuously since the War. George was gifted with horse

1913 Continued

sense, and he told me of several applications of it, which sounded very successful.

Thanks to the Alumni Office we have the following newspaper article (from the *Hawkes Bay Herald*, Napier, New Zealand) covering some of the peregrinations of colorful Marion Rice Hart, X: "Bringing with the remaining members of her original crew the recollection of a series of happenings so bizarre that her owner and navigator, Mrs. Marion Rice Hart, finds it difficult to believe they really occurred, the 90 ft. ketch-rigged auxiliary yacht, *Vanora*, arrived at Auckland today on a world cruise which began two years ago. It will finish when Mrs. Hart is temporarily tired of her wanderings. Before then the *Vanora* will stay at Auckland for probably a month and will then sail for New York by way of Cape Horn.

"Mrs. Hart is an American who is a graduate of the Massachusetts Institute of Technology. She was formerly a research worker for a large American electrical company, and was once arrested during the Great War while on a geological survey of the West Point Military Academy sector and was held as a spy until her identity was established. More recently she has spent several years as a sculptor. Her ownership of the *Vanora* dates back to a day over two years ago when she was at Montfauvet in France. 'I was tired of being responsible for so many things and people,' says Mrs. Rice Hart. 'I wanted to lead a carefree, gypsy life and drift about the world going where I pleased with no cares or troubles, contemplating the works of God.' She decided to buy a yacht. She had never done any small boat sailing in her life and knew nothing of practical navigating. Her search for a suitable vessel led her first of all to Cannes, then to England, on to the United States and finally back again to England, where the *Vanora* was discovered at Cowes. The yacht had already made one world cruise under the same name as the possession of Lt-Commander Hollins, R.N. It did not on that occasion visit New Zealand.

"Mrs. Hart bought the yacht for something over £700 and spent several more hundreds on fitting her out. To save money she, a nephew Paul Perez, who is making the cruise with her, a Greek woman doctor of philosophy, and a young English sculptor and his wife did the work of chipping, scraping, painting and generally getting the *Vanora* ready for sea. The cruise started from Cowes in August, 1936. At that stage Mrs. Rice Hart had no intention of doing her own navigating, but instead she said she looked forward to the comfortable and lazy life of owner-passenger. The dismissal of her first licensed captain, because he was going to take the yacht to sea with rigging so rotten that it came apart at a pull, did not shake her faith in the kind of life she would enjoy on such a cruise. Mrs. Hart's second master mariner set sail for Brest. He was slightly surprised, she said, when the port he reached proved to be Binic, Baie de St. Breiuc. Another captain who was engaged, a

Rumanian, could not sail after all because his wife would not let him, and still another was dismissed after it was found that his ship's log consisted of thermometer readings. Finally Mrs. Hart decided to become her own skipper. She said she had learned navigation from books as she went along and so far the *Vanora* had escaped shipwreck.

"Her crew had changed from time to time and she had stopped one or two fist fights among some of those who had gone. In addition to herself and her nephew, the other member of the original crew who arrived at Auckland is John Smith, from Bath, who acts as cook. Her engineer is a Greek, Emanuel Papadimitrius. Two New Zealanders who helped to bring the *Vanora* to Auckland from Nouméa, her last port of call, are Leonard Clarke and R. Findlayson, who left Auckland some months ago as members of the crew of the Auckland yacht *Seaward* which has just returned from a Pacific cruise. Mrs. Hart did not at first intend to come to New Zealand. After sailing through the Mediterranean and Suez Canal and calling at Aden, Ceylon, the Netherlands Indies, Komodo Island (where the crew hunted giant lizards), New Guinea and New Caledonia, it was intended to avoid the typhoon latitudes and sail back to New York by way of Tahiti and the Panama Canal.

"We suddenly decided it would be fun to sail through the Straits of Magellan," said Mrs. Hart, "and so we came on down from Nouméa to New Zealand. We have been on the coast trying to get into Auckland for the last five days, after nineteen days from Nouméa." The yacht was becalmed off North Cape on October 15 and last Monday it was hove to to escape the fury of a southerly storm. Mrs. Hart said they almost went on to the Hen and Chickens Group, and so on Tuesday morning they put out seawards in case they were driven on to the Four Kings. The only chart Mrs. Hart had was one for the whole of the New Zealand coast and consequently navigation to Auckland was done very carefully. The yacht passed Tiri Tiri at 4 A.M. yesterday and anchored for the night, being towed in this afternoon, assistance for which the owner said she was very grateful."

No wonder we couldn't have E. H. Smith, XIV, with us at the reunion. He was watching his icebergs. *Chicago Daily News* printed this article January 14: "Comdr. Edward Hanson Smith of the United States Coast Guard is getting all set for several months of iceberg hunting. Designated 'ice patrol officer' for 1939, he will board the Coast Guard cutter *Chelan* March 1 and speed to the Grand Banks of Newfoundland to determine ice conditions in the North Atlantic and ascertain the location and progressive movement of ice toward the North Atlantic steamship lanes. While he and his Coast Guard crew are making this preliminary inspection, the cutter *Champlain* will be awaiting the wireless order to join him. From March 15 to July 15, two Coast Guard cutters are kept on ice patrol duty with a specially equipped

cutter that carries the scientist designated to conduct oceanographic work through the ice patrol season.

"The ice patrol keeps at least one vessel on constant 24-hour watch during the months of the ice season. It is continually scouting to locate the huge masses of ice which break away from the immense glacier that covers Greenland to be carried South by the Labrador current directly toward the path of ocean craft driving through the mists, fogs and storms of the Grand Banks off the southeast coast of Labrador. Those bergs that are not melted before they get to the steamship lanes are located by the patrol and each is given a number. Thereafter the exact location, drift and other important information concerning the huge floating menace is flashed by wireless to all vessels, together with instructions, which in effect are official orders, directing shipping to use designated lanes. This is law. If a skipper disregards it and takes a chance he is subject to heavy fines. Comdr. Smith will go down in Coast Guard history as the 'ice patrol officer' of the ice patrol's silver jubilee year, for the patrol officially is 25 years old this year. The immediate cause of its organization was what is known as the 'greatest of all marine tragedies,' the sinking of the then largest steamship in the world, the *Titanic*. It crashed into the submerged ledge of an iceberg on April 14, 1912, with a loss of 1,500 lives.

"Almost immediately after the *Titanic* disaster, the Coast Guard began patrolling the Grand Banks hunting icebergs. This was done on the initiative of the American government and at its own expense. In 1914, however, delegates of 20 nations met in London to discuss the question of life at sea and they agreed that the Coast Guard should organize an ice patrol service, with each government paying its share of the maintenance expense. This agreement is known as the 'London Convention of 1914.' This year's traffic boss of the steamship lanes, Comdr. Smith, has been living temporarily in Washington. Born in Vineyard Haven, Mass., 50 years ago, he passed through the town's schools and then graduated from the Massachusetts Institute of Technology with the class of 1913. He is married, has three children and belongs to a number of scientific societies and organizations." — FREDERICK D. MURDOCK, *Secretary*, Murdock Webbing Company, Box 784, Pawtucket, R.I.

1914

Walter J. Hauser writes that he will vote for having the class reunion in the winter, because this year again, as for several years past, he will be in Persia — now Iran — digging for antiquities. Hauser has for many years been associated with archaeological activities pertaining to ancient civilizations. — Another who laments his inability to attend is C. W. Ricker, who is head of the electrical engineering department at Tulane University. Rick finds it necessary to stay at the university because of local commencement activities, but says he will try to

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atone for his reunion absence by active participation in Mardi gras, for which New Orleans is noted.

Howard Borden is back in New Jersey and is senior examiner at the Trenton office of the State Unemployment Commission. Borden says that many of the decisions require the wisdom of Solomon. For example, is a machinist who opens up a garage, but who gets no business, employed? How about the commission salesman who makes no sales?

Last month it was reported that Halford Ambler's only son, 19 years of age, was seriously ill. After showing some improvement, he died suddenly of heart failure on February 18. To Halford and to Mrs. Ambler our sincerest sympathy is extended. — H. B. RICHMOND, *Secretary*, General Radio Company, 30 State Street, Cambridge, Mass. CHARLES P. FISK, *Assistant Secretary*, 1775 Broadway, New York, N.Y.

1915

"Write to Dennie" (1911)! "Help Azel" (1915)! — These are two stirring appeals that should produce plenty of class notes. That Dennie's works, you can read; it's up to you to make mine produce. First message this month: Prepare to come to the class cocktail party at a Boston hotel on Monday afternoon, June 5, from 4 to 7. This immediately precedes the Alumni Dinner. You are invited to bring guests (male or female) — family, friends, and relations. We want to see lots of ladies this year; so bring them along.

On March 2 we had a Boston class dinner and started plans for our coming 25th reunion. This meeting will be reported in the May Review. — In the Boston *Herald's* annual industrial review, January 29, is a write-up and picture of Ralph Hart, X. His company, the Hart Products Corporation, manufactures chemicals for the textile industry under the name "Hartex." The following extract from the long article calls for our congratulations to Ralph for his success: "Visitors to the offices and laboratories of the Hart Products Corporation of New York may be pardoned for thinking they have wandered into an M.I.T. reunion, so many graduates of our famous institution are found among the officials, executives and employees of this well-known concern. This is due, no doubt, to the fact that Ralph Hart, the founder and president of the corporation is a 'Tech man,' having received his degree with the class of 1915. Though admittedly loyal to his alma mater, Mr. Hart, however, has also drawn upon other scientific schools in building up his staff. The scholastic attainments upon which he insists are reflected in the high reputation borne by the products which are originated and manufactured in his laboratories and works in Woodbridge, N.J. They are sold through headquarters in New York city and branch offices in Boston, and Spartanburg, S.C.

"After taking his bachelor's degree in chemical engineering at the Massachusetts Institute of Technology, Mr.

Hart spent a number of years in gaining practical experience in the manufacture of textile chemicals and specialties and in 1920 organized his own business and speedily gained recognition as an outstanding authority on textile processing agents.

My local travels have brought pleasant contacts with several classmates and other Technology men. It's always warming and gratifying to feel the close bond of so many fine friendships: Lunch with Dennie in Worcester plus his help with his usual loyal and willing interest; an evening at Edgartown, Mass. (Martha's Vineyard), with Charlie Norton, who is close to first prize for bald heads and whose daughter is a Smith freshman; lunch in Lowell with Reggie Foster and Chet Runels and Chet's brother of 1911; Boston meetings with Archie Morrison, Bill Brackett, Roland Baldrey, and Larry Landers at different times.

Newsweek of January 30 under "aviation" carried a story of Virginus E. Clark's [XIII] development work on a plastic fuselage, "Duramold," for airplanes — a contributing factor in increasing plane production for our new air defenses.

My plea, "Help Azel," fell on little Andy's ready ears (Albert H. Anderson), and his splendid letter relieves the depression in class notes. Just which dwarf could Andy qualify to replace? Take a guess! Looks as though time is marching on for him when he begins to have the bends. You understand, of course, that this is a trade term used by the sand hogs and does not apply to the resilient condition of legs and arms that little Andy exhibited at our Saybrook reunion and that he and that smooth Charlie Williams probably carried away from the dinner he mentioned: "... If everybody writes as often as I do, I can see that it isn't Azel's fault that we are no longer mentioned in the class notes. When I wrote last I was with the Port of New York Authority on the construction of the Lincoln Tunnel. I left there last May, as the main part of the construction, or the part I was interested in, was completed. By the way, I want to give a little boost for the Lincoln Tunnel: I was also on the Holland Tunnel job, but the Lincoln has kept up with the times and, in my opinion, should be very popular and should prove a great relief to the load on the Holland Tunnel. When I left the Lincoln Tunnel, I went with the Walsh Construction Company on the new vehicular tunnel being built from East 42d Street, New York, to Borden Avenue, Long Island City. If you have ever battled the traffic on the Queensboro Bridge at 59th Street, you know what a boon this is going to be to New York traffic going to Long Island. It's also in the wind to connect this tunnel directly with the Lincoln by a cross-town tunnel through midtown New York. Traffic could then go from Long Island City to New Jersey in about eight minutes. The north tube has been in operation about a year, carrying two-way traffic. The lighting and paving is much better. The Holland is

still popular and is carrying peak traffic. The Lincoln will take its share when the connecting highways are ready over on the Jersey side.

"I've been on quite a few tunnel jobs but this was about the toughest one I ever ran up against. The Hudson River with its silt is a cinch, but the old East River is something else. George Rooney will remember something of the 60th Street Brooklyn-Manhattan Transit Tunnel, but that was only 18 feet wide and this one is 32 feet, and in the tough ground such as we went through, that is no small opening. We ran into everything and all kinds of ground after leaving Manhattan. We had an accidental tunnel fire along with our other troubles. We are out in the river now and having clear sailing and, although there is still some big work ahead, the ground will be all right from now on as we are disturbing God's work and not that man-made earth we hit going out of Manhattan. Queens was all right, as the rock ran far enough out into the river so that we did not have to remove man-made ground. I've been getting along all right so far. Right now we have 37 pounds of wind, and I am still taking it like a youngster. October, for some reason, was a tough month. I've had touches of the bends in the years I've been a sand hog, but believe it or not in October I had to go back for treatment three times; spending the night in the medical lock is no fun at all. Then the last week of that cursed month I fell and thought I had some cracked ribs, but the x-ray pictures said no, so I took it easy for a week and went back again. That's enough about work. Work is all right and very necessary, but then again I wish there weren't any such thing; still, I don't think I'd quit if I could. There is something about this tunnel business that I like.

"Anyway, between jobs Mrs. Anderson and I did get a little time off, and we went out to see what the other side of our United States looked like. We saw plenty and missed plenty, so we will have to go again when we get another chance. We went southwest through the Painted Desert to Grand Canyon and up to Boulder Dam and then on to San Francisco. Going through Tulsa, Okla., I called up Bill Holway, but he was out of town, so missed seeing him. From Frisco we went up to Los Angeles and Hollywood. There was a rumor back in New York that I went out there to get a job as one of the Seven Dwarfs. From there we went on to Salt Lake City, up to Yellowstone, and then back across Wyoming till we found the route to Chicago. Chicago is always a good stopping place. From there we headed east and back to the tunnels.

"I don't believe that I wrote you about that last dinner I went to that the Tech Club had here in New York. I had hoped to meet a few of the boys, but Charlie Williams and I were the only '15 men there. Well, Charlie and I did all right for ourselves and I guess Charlie was glad that I appeared from his old Course I gang. Charlie was all rigged out in one of those monkey suits, even to the tall,

1915 Continued

stiff hat. He was a good committeeman, as he dropped me off at my door after a very enjoyable evening. — I was up around Boston at Christmastime, but as usual it was one of those hurry-up trips and back to work the day after. I'd like to find time enough up there sometime to drop around and see the old gang. Nineteen-forty will soon be here, and then I hope we will all be at the big 25th reunion round-up once more. Remember me to everyone." Thanks, Andy, for your fine letter. Your description of the new vehicular tunnel and your work is most interesting.

"Help Azel" make the May column a big column for 1915. — AZEL W. MACK, Secretary, 40 St. Paul Street, Bookline, Mass.

1916

Tom Holden, Vice-President of F. W. Dodge Corporation, in forecasting conditions in the construction industry for 1939, recently had the following to say before the Merchants' Association of New York: "Construction activity, generally regarded as the key to recovery, should show substantial increases throughout the country in 1939. Favorable factors include the recent upturn in private residential building, the starting of the new Federal program of public housing projects, continuation through the first part of 1939 of the current public works program, and improved business sentiment, which should encourage deferred industrial projects, increase commercial remodeling and small new commercial building, and, possibly, some improvement and expansion of public utility plants. Continued upward trend of private construction into the latter part of next year will depend largely on relative stability of construction costs and on general advances in business and employment."

Walter D. Binger, commissioner of borough works for the city of New York, broke into print in the *New York Times* on Wednesday, January 18, when his picture appeared alongside a pneumatic drill when ground was broken for the new link on East River Road, the section running from 49th to 92d streets. — Word has just reached your Secretary that A. R. Keller, who is dean at the University of Hawaii, sponsored for the university a meeting of the Engineering Association of Hawaii on Saturday, January 28. — C. J. McCarthy, manager of engineering at the Chance-Vought (aircraft) Corporation, East Hartford, Conn., has returned from Paris, France, where I understand he worked on engineering matters from early in the morning until nine at night, and then with his charming wife, Betty, worked at social functions until well past midnight. Furthermore, I understand that this was practically a daily routine for the period of almost two months that Charlie was in Paris. Perhaps we can have more details later.

Your Secretary ran across Paul Buxton recently in a business way. The following brings us up to date on Paul's activities: "We moved out here to Alton, Ill., from

New York some nine years ago and I have been with the Western Cartridge Company ever since. When I stop to think that my daughter, Cecil, is a freshman at Elmira College in New York, and my son, Charles, is planning to go East to school next year, I realize that it is quite some time since we were at the Institute. I do not see very many of the M.I.T. men in this district since everyone is apparently bent on taking care of his own business. However, when any are in this district, I should be most pleased to hear from them." — JAMES A. BURBANK, Secretary, The Travelers Insurance Company, Hartford, Conn. STEVEN R. BERKE, Associate Secretary, Coleman Brothers Corporation, 245 State Street, Boston, Mass.

1917

Hamilton L. Wood suffered a serious attack of lobar pneumonia following a bad cold that had set in shortly after the holidays. His reaction to the serum was serious, and late in February he reported that he was able to sit up two or three hours in the morning and the afternoon and that he had been over the stairs twice. He hoped to return to his office for brief periods about the first of March, but obviously had a long siege of recuperation still ahead of him.

Al Lunn, at this writing, is on his way to Europe in the interests of Dewey and Almy Chemical Company. I ran into him on a train recently with his chief, Bradley Dewey '09. At the present time they are exciting much interest with Cryo-Vac latex-rubber food containers which are being offered for packaging of poultry and fish and for protecting other food products up to whole sides of beef during freezing, storage, and so on. The company has developed ingenious devices for use of the new packaging and protective material, and Al has been active on many of the commercial and policy aspects.

Infected by the pernicious radio disease, this column will, next month, offer guest artists. Frederick Bernard has graciously offered to appear and to present notes from some of the men who have been cruelly — or should we say, luckily — neglected. We hope that he may have set an example for others. — RAYMOND STEVENS, Secretary, 30 Charles River Road, Cambridge, Mass. PHILIP E. HULBURD, Assistant Secretary, Phillips Exeter Academy, Exeter, N.H.

1921

A. Warren Norton, XV, chairman of the Alumni Day Committee, is rapidly completing plans for the next general alumni celebration on Monday, June 5. Advance information from this imposing committee indicates such an unusually attractive program that we hope more members of the Class will include Cambridge in their vacation itineraries. In recognition of Warrie's many alumni activities as a former officer of the Technology Club of New York and now as a very busy member of the Alumni Council, the National Nominating Committee has named him as a candidate for vice-president of the Alumni Association in this

year's election. Now is the time for all good men to vote early and vote Norton!

S. Paul Johnston, II, editor of *Aviation*, was one of the speakers at the sessions of the National Aviation Forum which met in Washington, D.C., on February 20 under the auspices of the Joint Aviation Council and which was sponsored by the National Aeronautic Association.

William Rose, Jr., IV, plant superintendent and assistant to the president of the Christian Feigenspan Brewing Company of Newark, N.J., played host to about 135 members of the M.I.T. Club of Northern New Jersey at a "stein on the table" smoker in the huge P.O.N. brewery on February 2. Following an extensive guided trip through the major departments of this largest of all breweries in the United States, everybody enjoyed a delicious beefsteak dinner which was served in the brewery and punctuated at ultrahigh frequency with foaming steins of superdelectable P.O.N. The favors, decorations, and souvenirs, plus a really good orchestra from the club's membership, the opportunity for everyone to get together, and the complete absence of all speeches contributed to make the evening an occasion that won't be forgotten. Members of the Class who joined in the chorus of thanks and appreciation to Bill and the hospitable P.O.N. staff included Max Burckett, VI, Bill Emery, II, Sumner Hayward, X, and Cac Clarke, VI. Here's how again, Bill — and may the popularity of P.O.N. continue to transcend the modern vogue for initials which it anticipated.

We ran into Mal Lees of 1920 at the P.O.N. party. He reported that in December he had moved his family from Winchester, Mass., to 188 Gramercy Place, Glen Rock, N.J. Mrs. Lees will be remembered as Connie Nelson, IV, whose interest in the drafting board has been transferred to two fine sons. Mal has been in the Boston offices of the First Boston Corporation and is now with their New York City organization at 100 Broadway.

With a bow to the January issue of *Course VI-A News*, we learn that "a recent visitor to the new VI-A headquarters was Dugald C. Jackson, Jr., of the first group to graduate in VI-A." The article continues, in part: "Dugle, since last June, has been assisting in the preparation of a report for the Carnegie Foundation for the Advancement of Teaching, which will deal with the present status of engineering education. In this work he is arranging and analyzing the information which was gathered from 1935 to 1938 by the E.C.P.D. Committee on Engineering Schools of which Dr. Compton is chairman." Dugle is making his home at 427 North Kenilworth Avenue, Oak Park, Ill.

Coincidentally with our announcement in the February issue of *The Review* regarding the forthcoming book, "The Glass Giant of Palomar," by David O. Woodbury, VI-A, the February issue of the *Reader's Digest* ran an extremely interesting excerpt from the book, which is now about to be released by Dodd, Mead and

You will find on page 1 information on Alumni Day, June 5

1921 Continued

Company, New York. Dave's book is a running account of the entire history of George Ellery Hale's ('90) dream of a 200-inch telescope and its ultimate realization. Judging by the condensed version, Dave has certainly collected fascinating data and written a first-rate account of it.

Congratulations are in order for two recent promotions. Previously a lieutenant commander, Commander Homer N. Wallin, XIII-A, is now located in Washington, D.C., with the bureau of construction and repair of the Navy Department. The former lieutenant and now lieutenant colonel, T. Dodson Stamps, I, is now stationed at the United States Military Academy, West Point, N.Y. — More congratulations are in order for an announcement which has just been received: "Mr. and Mrs. William Washington Noble announce the marriage of their daughter, Ruth, to Mr. Ralph Stanley Wetsten on Friday, February 17, 1939, Summit, N.J." Mrs. Wetsten is a native of Denton, Md., and was graduated from Johns Hopkins and Columbia Universities. Ralph is the son of Mr. M. C. Wetsten and the late Mrs. Wetsten of Rockville, Conn. He was graduated from Yale and from Technology in that famous first group of VI-A, and is now distribution engineer of the Public Service Electric and Gas Company, 80 Park Place, Newark, N.J. The newlyweds will make their home at 87 Passaic Avenue, Summit, N.J., where our good wishes are directed.

Here's where you'll find those of the Class whose addresses have changed recently: Captain Charles F. Baish, I, 1810 37th Street, Northwest, Washington, D.C.; Gustav C. W. Carlsson, Stockholms Superfosfatfabriks, Attiebolag, Ljungaek, Sweden; Dr. Ivan F. Chambers, X, 4500 Sheridan Avenue, Miami Beach, Fla.; Milford P. Graham, X, 6 Johnson Road, Andover, Mass.; Frederick L. Healy, X, manager of the claim department, State Farm Mutual Auto Insurance Company, 1031 South Broadway, Los Angeles, Calif.; Lloyd F. Hoops, Poplar Road, R.F.D. No. 1, Middletown, Conn.; Herbert A. Kaufmann, X, 5460 Hyde Park Boulevard, Chicago, Ill.; Robert F. Miller, XV, 614 Raymond Street, Westfield, N.J.; Charles F. Parker, XIII, Box 273, East Pepperell, Mass.; Steve J. Seampos, II, 2 Perkins Manor, Jamaica Plain, Mass.; John E. Shaw, III, 1314 Santa Fe Avenue, Los Angeles, Calif.

Beware the spring fever bug — and get that letter off to your Secretaries now! — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, 10 University Avenue, Chatham, N. J.

1922

Your Secretary has little information about the unusual wanderings and doings of the members of our illustrious Class. Whenever a beer party is in the offing, you will find 1922 much in evidence, and by reference to the notes of the M.I.T. Club of Northern New Jersey, you will see that Bill Rose '21 was host to the

Club at the last smoker. Bill Grady was chairman of the committee, and Jack Teeter took care of the singing.

E. R. Thomas, VI, of the Consolidated Edison Company of New York, Inc., gave a paper on "Economical Loading of High Tension Cables Installed in Underground Subway Systems" at the convention of the American Institute of Electrical Engineers in New York on January 26.

The New York *Herald Tribune* for Sunday, January 15, carried a notice of the death of Lieutenant Colonel R. G. Guyer, army corps of engineers, retired. Colonel Guyer was graduated from West Point in 1916 and finished in Course I at the Institute. He retired a year ago because of illness. We extend the condolences of the Class to Mrs. Guyer and the three sons.

A few recent address changes which have come through the Alumni Office are as follows: Malcolm K. Sheppard, II, from 2816 Broadway to 260 Woodhaven Drive, Pittsburgh, Pa.; Francis A. Snell, II, from Clarksville, Texas, to the Magnolia Petroleum Company, 721 Browder Street, Dallas, Texas; Dr. William T. Haebler, X, from Milwaukee, Wis., to 60 Rockledge Drive, Pelham Manor, N.Y.; Lester C. Lewis, VIII, from Chillicothe, Ohio, to 14 Gray Gardens West, Cambridge, Mass.; Alfred J. Maria, X, from Norfolk, Va., to 511 Harvard Street, Houston, Texas; Eugene P. Rowell, Jr., XIII, from Glen Rock, N.J., to 1701 16th Street, Northwest, Washington, D.C.; John O. Bower, XII, from New York City to Antilles Petroleum Company, Post-Office Box 31, San Fernando, Trinidad, British West Indies; Lewis E. Spear, XV, from Los Angeles, Calif., to 1155 South Grand Avenue, Pasadena, Calif.

Yard Chittick says that the Register of Former Students would like to determine the present addresses of C. Winchester DeVito, whose last known address was 928 West 8th Place, Los Angeles, Calif., and Irving Papov, whose last known address was 20 Harlem Street, Dorchester, Mass. If the whereabouts of these classmates are known to you, please advise the Alumni Office or the Class Secretary.

As these notes were being laboriously compiled, Frank Kurtz called on the telephone, as though by mental telepathy, with interesting news. He says that King Crofton absented himself from the coal business in Rochester long enough to spend a day in New York, and that John Strieder, now Dr. Strieder, was down from Boston for a few days. Frank and Ray Rundlett and some of the others have been discussing possible plans for a class get-together in the New York metropolitan area, and by the time these notes have appeared in *The Review* you should have received a post card asking for your comments on a meeting of some kind for those of our Class who live in or near New York City. If you have not received such a post card, it probably means that we do not have your latest address in our class files, and it behooves you to advise the Class Secretary to this effect.

The annual banquet of the M.I.T. Club of Northern New Jersey will be held at the Newark Athletic Club, Newark, N.J.,

at 6:30 P.M. on Thursday, April 20. This is always an enjoyable affair, and there is always a good turnout of our Class. If you should happen to be in the vicinity of Newark or New York on April 20, try to join our group at the Newark Athletic Club. — CLAYTON D. GROVER, *Secretary*, Whitehead Metal Products Company, Inc., 303 West Tenth Street, New York, N. Y. C. YARDLEY CHITTICK, *Assistant Secretary*, 77 Franklin Street, Boston, Mass.

1923

Eight showed up for a luncheon meeting of the Boston 1923 group on February 4 at the Boston Chamber of Commerce. The eight were Howard Russell, Walt Marder, Bill Blandy, Bill Gallup, H. B. Golding, George A. Johnson, Fred Mann, and your Secretary. Possibilities of a dinner dance for a next meeting were discussed.

News doesn't trickle into this department as fast as we should like. The March notes carried the announcement of the engagement of Miss Gertrude Busch to Henri Pell Junod. Due to the limitations of our news machinery, by the date the notes appeared the couple were already married and off to the West Indies for their honeymoon. A clipping from the *Chicago Tribune*, now before me, tells of their marriage at the Little Church Around the Corner in New York on January 21. Tom Boyd, himself just married in December, was best man. Following their wedding trip the couple are to be at home at 900 North Michigan Avenue, Chicago.

Stan Champion, formerly with Moody's Investors Service, writes that he has opened his own business as an investment counselor. After a brief fling at engineering work following graduation, he found his real interest in security analysis, and since 1926 he reports having worked on all phases of this field. His new office is at 70 Pine Street, New York City.

Stanley S. Setchell reports that prior to 1932 he was with the architectural firm of Mowll and Rand in Boston. Since 1934 he has been with Perry, Shaw and Hepburn, also of Boston, where he is chief draftsman. He writes: "It is certainly a most interesting job as this office has many widely distributed jobs such as in Virginia, Maryland, Kentucky, as well as in Maine and other near-by states. For the benefit of other Course IV members, this firm is the one which has done the Williamsburg, Va., restoration for John D. Rockefeller, Jr. Another possible item of interest might be that my wife, Martha Powell Setchell, has become art editor of a nationwide magazine called *World Horizons*. It is published in Wellesley, Mass., and has just been adopted as the official magazine for the 4-H Clubs throughout America. The magazine is primarily for the younger people, although it has many articles for adults. It is also used greatly in schools and libraries."

Pete Pennypacker's report on the 15th reunion last summer has recently been mailed to those who attended or who had paid class dues. It's a fine job, 24

1923 Continued

pages, profusely illustrated, with all the dope on the party. Notable is a running (or should I say *dripping*?) account by historians Miles Pennybacker and Lem Tremaine. Archie Williams put the report in shape for printing and has a few copies left which he will be glad to send to any member of the Class who will send in his \$2.00 class dues. Address Professor Archibald Williams, M.I.T. — HORATIO L. BOND, *Secretary*, 457 Washington Street, Braintree, Mass. JAMES A. PENNYBACKER, *Assistant Secretary*, 96 Monroe Road, Quincy, Mass.

1924

From Professor Locke, whose class affiliations are much too numerous to include here, we have word that Charlie MacBrayne has announced the arrival, on November 20, of Charles Robertson MacBrayne, Jr., already a potential member of the Institute's Class of 1961. Charlie is still superintendent of the plant of the Matthiessen and Hegeler Zinc Company at La Salle, Ill. — From the *Herald Tribune*, the Secretary learned of the death of Lloyd Logan, head of the chemical engineering department of the College of Applied Science, Syracuse University, and a former member of the faculty of Johns Hopkins University. This occurred on December 29.

A syndicated column appearing in many papers reports that Dave Lasser and his wife now live in Georgetown, whence Dave commutes to his job as top man of the Workers' Alliance in Washington. Referring to Lasser and to John L. Lewis the columnist winds up with the terse comment: "Lasser rises in prominence. Lewis falls."

By now you know much of the reunion story. Be sure to send in your registration. Be sure to attend. And be sure to get those movies in early. The committee has plans afoot to make this the biggest and the best of reunions, and you can't afford to miss it. — FRANCIS A. BARRETT, *General Secretary*, 50 Oliver Street, Boston, Mass.

1926

The Secretary recalls hardly a time when the collective Class seems so nearly to have hibernated for the winter. Normally each month we get, through our clipping service, a wide variety of newspaper stories about the escapades and achievements of the many front-page personalities in the Class. The last several months these clippings have dropped sharply. The reason behind this apparent inactivity is obscure. Perhaps it might be ascribed to the fact that the Class is midway between its 10th reunion and its 15th — the inspiration of the earlier meeting having died away and the anticipation of the coming one not yet having been aroused. That can shortly be taken care of.

Just three items of information are available this month: (1) that Eliot Kimball Grant has been married to Miss Marian Louise Holt of Woburn, Mass; (2) that Edwin E. Spitzer was on the program to deliver a series of lectures at the second annual Broadcast Engineering

Conference sponsored by the department of electrical engineering of Ohio State University; and (3) that Flint Taylor won acclaim in the Boston Community Fund Drive as staff secretary of the institutions division, the division of which President Compton was chairman and which went far over its quota in the campaign. — J. RHYNE KILLIAN, JR., *General Secretary*, Room 3-208, M.I.T., Cambridge, Mass.

1927

A number of years have passed since we have been able to bring you word about Bud Cole. He is now associated with Lord and Thomas, advertising agency, doing sales research. Bud was formerly with the United States Rubber Company in their service department; then a refrigeration salesman with English and Lauer, manufacturers of air-conditioning equipment; and most recently a salesman for York Ice Machinery Corporation. His present headquarters are in Los Angeles. — The engagement of Miss Ruth Leicester Connolly of Newburyport to Edmund Burke was announced in the late fall. Miss Connolly is a graduate of Abbot Academy and Smith '29. Burke is practicing architecture in association with J. Hampden Robb in Boston.

Course VI-A *News* tells us that Dick Cutts is in the Boston office of General Electric Company. Ted Leach is also connected with G.E., at Schenectady, where he is head of the section of mechanical design of radio transmitters. — Bob Bonnar, who is with General Dyestuff Corporation, is located at the company's headquarters at 435 Hudson Street, New York City. — Howard Lary is in charge of the Denver regional office of the Securities and Exchange Commission as regional administrator. He made one of the principal talks at the convention on the S.E.C. Acts as applied to mining companies. — Ralph Johnson made an unexpected appearance in New York shortly before Christmas, and your Secretary reports a very pleasant evening spent at Jim Lyle's home with Ralph, Jim, and Dike Arnold, who also happened to be in New York at the time. Ralph is connected with the Honolulu Electric Company, and was making a combined business and pleasure trip in the States. — RAYMOND F. HIBBERT, *General Secretary*, Care of Johns-Manville Corporation, 22 East 40th Street, New York, N.Y. DWIGHT C. ARNOLD, *Assistant Secretary*, Arnold-Copeland Company, Inc., 222 Summer Street, Boston, Mass.

1928

The big news for the Class this month concerns the record transcontinental flight of Ben Kelsey which was, unfortunately, climaxed by a crack-up at Mitchel Field, Long Island. This headline news story was summed up very aptly in *Newsweek* for February 20, from which we quote the following paragraphs: "The morning of February 11, news wires hummed with reports that an Army mystery plane was out for a transcontinental record. By the time Lt. Ben S.

Kelsey breezed his ship into Amarillo, Texas, from March Field, Calif., for refueling, the reports had been confirmed; newspapermen discovered that the ship was the new Lockheed substratosphere pursuit job that had been undergoing quiet tests for the past month — and that it approached 400 miles an hour speed.

"As Kelsey roared on to Dayton, Ohio, interest in his flight mounted. He refueled again, then whipped toward Mitchel Field, Long Island, with the two 1,000-horsepower Allison liquid-cooled V-12s hammering away steadily. But as he glided in to land, the light plane lost speed too rapidly. Kelsey gunned his motors. Only one responded, veering the plane around so that its tricycle undercarriage grazed a tree. Kelsey cut his switch, and the ship fell into a golf-course sandtrap almost a total wreck. Passers-by removed the flyer, slightly injured, from the single-seat cockpit, but soon an Army cordon shooed them all away. . . .

"Lieutenant Kelsey's mishap won't prevent the Army from going ahead with light, twin-engined high-powered planes, which answer Germany's speed challenge in military aircraft. At least one other pursuit plane of different design but similar specifications is now under construction in this country. That the Army was pleased with the ill-fated plane was apparent; otherwise, no transcontinental flight would have been authorized. And while Kelsey failed by 17 minutes 11 seconds to equal Howard Hughes' record of 7 hours 28 minutes 25 seconds elapsed time west-east from coast to coast, the Army flyer averaged close to 340 miles an hour while he was in the air, as against Hughes' approximate 330 miles an hour, but lost time refueling. . . .

"The liquid-cooled Allison engine — which Army engineers have been working with for years — is at a high degree of perfection. Designers have 'souped up' the most recent model to 1,250 horsepower, and a much larger motor of the same type will be announced soon. These 'in line' power plants have two advantages over the air-cooled radials: the V construction lends itself to perfect streamlining, and they form a perfect, rigid mount for formidable quick-firing light cannon."

Holiday greetings were sent to us by Bill Woods and family from Post-Office Box 13, Bellaire, Texas. The Woods family has been growing by leaps and bounds, and now consists of three boys — two, five, and seven years — and one girl, aged eight. And, by the way, we're still trying to determine whether any classmate has exceeded the four-children record at this point. — Congratulations this month to Donald and Mrs. Fraser on the arrival of a son, Malcolm Douglas Fraser, on January 28. — GEORGE I. CHATFIELD, *General Secretary*, 6 Alben Street, Winchester, Mass.

1929

Every day brings us closer to the time when we will celebrate our 10-year reunion. By the time these notes are pub-

You will find on page I information on Alumni Day, June 5

1929 *Continued*

lished, our reunion committee will have completed plans and probably circulated publicity data on that great event. If you have procrastinated in making definite plans to join us, let us urge you to send an affirmative reply to the committee or to your Secretary just as soon as possible. In that way, our reunion committee will have a reasonably early return on which to base their plans. Let's all consider ourselves part of this committee and do all we can to put our reunion across, instead of leaving the entire burden on the shoulders of a few willing committeemen around Boston and New York.

Late news clippings disclose the fact that we will have two more men eligible for the married men's events at our 10-year reunion in June. Washington papers report that Miss Margaret M. Yard of that city and Bill Tyler, 3d, VI, were married on December 10. Bill is located in Washington, where he is superintendent of the Folger Shakespeare Library. — Boston papers reported the marriage of Miss Marion F. Fogarty of Roxbury, Mass., to Paul F. Donahue, IV-A, in Roxbury on January 30. If the information in the last Register of Former Students is still correct, Paul is engaged in business in Lynn, Mass., and since the firm name includes Donahue, we can guess that he turned out to be an architect and is a member of the firm. Congratulations are in order here and now, and we extend them with all sincerity and best wishes, but let us anticipate the further pleasure of greeting these newlyweds at the reunion, where we can do the honors in person.

A clipping from the Course VI-A *News* points out that our Class is well represented in the Bell Telephone Laboratories in New York in the persons of R. D. Fracassi, Dex Osgood, O. R. Garfield, and E. H. Perkins. The article went on to say that the foregoing men got together with Professor Wildes '22 for lunch in New York recently, where the latter was to attend a symposium on matrices.

Last month we enjoyed a lengthy letter from Elmer Skonberg down Louisville way. This month we have another treat from a classmate who finally took pen in hand after these nearly ten years and gives us the low-down on what has been going on in his world since 1929. It is Wallie Gale, XVI, and he has written such a newsy letter that we are going to include it: "For the past ten years I have been a cover-to-cover (well, almost) reader of *The Review*. Invariably I start with the class notes, in the hopes that I may find a bit of news about some familiar name, and more often than not I am slightly burned up at my fellow classmates' stinginess with letters. You do a grand job of dishing out what the '29 men give you to work with, but there seems to be an epidemic of writer's cramp or modesty among our group which has deprived us of our share of Westbrook Peglers, John Gunthers, or similar correspondents and contributors. It recently occurred to me that I was one of the large majority who have never done anything

to help the cause along. My alibi is, of course, that I have never considered any of my experiences before or since graduation worthy of publication in so august a journal as *The Review*. In *Town Topics* or *Ballyhoo*, maybe, but *The Review*—never! However, in the hope that it might inspire someone else to contribute who can tell us of real adventure, such as mining radium on Great Bear Lake or roughnecking in the oil fields of Bahrein, I am taking my hair down to the extent of summarizing my own futile wanderings since the balmy days of '29. With our tenth reunion only a few months away, let's pack the notes each month with the doings of the gang, so we'll be all caught up on the news by the time we meet in June. Come on, boys, give. . . .

"Those who find themselves unduly bored with the following gibberish can blame a seemingly unrelated set of circumstances: (1) a burned-out set of connecting-rod bearings; (2) a most uninteresting group of fellow train passengers; (3) the fact that business (with us at least) can best be described by borrowing the classic remark from 'You Can't Take It With You': 'Confidentially, it stinks!' To explain this somewhat screwy preamble: If the bearings in my car had not given up the ghost recently in the sunny state of California, I should not be riding a train across the continent at the present time. Or, riding a train, had I found a congenial soul with whom to swap yarns in the club car, I should not be torturing this typewriter. And, thirdly, if orders were rolling in fast enough to justify the extra fare, I should be riding the streamline *Chief* and would now be nearing Chicago. But as it is I am rolling across the bleak Kansas prairies in mid-December on the second morning of an interminable journey — no one in the car to talk with except a dyspeptic-looking man of some three-score years, another drummer like myself, whom I find to be the worst of all bores, and a horsey-looking blonde who resembles a Peter Arno impression of a Swedish cook after a hard night out. So in sheer desperation I turn to my portable, come what may.

"I shall attempt to summarize as briefly and painlessly as possible what the past ten years have done to me and mine. This is strictly for the records and is not submitted for its news value or emotional appeal. The few of you who remember me back at Tech may recall that I was one of the young hopefuls who jumped on the Course XVI band wagon during the startling days when Lindbergh, Guggenheim, and others were air-conditioning the minds of all. A million planes by 1930, foolproof flivver planes for \$700, and a pilot's license with two pairs of pants for \$14.98 were among our more conservative visions. But the hours were short and the nights were long, and a good time was had by all. After four years of anything but concentrated effort I realized that I didn't know enough to design a plane that would hold together in the hangar, much less in the air, and so that the time wouldn't be a total loss I decided to try a fifth year. During this

graduate year the more trivial and haphazard diversions of my undergraduate days were gradually replaced by such serious purposes as getting a job, getting married, and so on, and I put in what was up until then the only year of hard work in my life.

"Thanks to the kind indulgence of Professor Newell '19 and a quaint curiosity on the part of certain aircraft manufacturers as to what happens when a tin can is bent, I spent the next five years in and around the aeronautical engineering laboratories at Tech, building and bending tin cans. The purpose, I was later told, was to set up some method, empirical or otherwise, for the design of *monocoque* airplane structures. Inasmuch as those five years were the famous five of Depression No. 1, I was more than delighted with the set-up which insured three square a day, with enough left over for me to acquire a wife, a son, and a daughter — all in proper order. High lights of those years were: (1) catching an inside straight flush against Professor Woodruff '18 and his mathematical theories of card distribution; (2) our fifth reunion, when Bill Aldrich and Jack Hallahan straightened out a curve in my new Ford, thus depreciating it some \$500 in a split second (they presented me with a brand new one the next Monday, incidentally); (3) taking over Professor Newell's graduate course in structures, while he went to Japan, and having a student come up after my first very nervous and uncertain lecture and inform me that he might be a little slow in following my lectures, as he was an exchange professor from Germany in that subject and did not understand English very well. I was glad he didn't.

"The Institute's patience and the industry's curiosity having dwindled to the vanishing point by 1935, the Gales's suddenly found themselves in South Bend, Ind., working for the Bendix Aviation Corporation, Stromberg Carburetor division. The peculiar transition from stress analyst to air-box operator is a trifle too complicated for the present chronicle and in fact has never been clearly understood by either the writer or Mr. Bendix. But a very interesting year was put in, nevertheless. Our pal, Ed Partington, who used to annoy me by asking intelligent questions in applied mechanics lectures, thus disturbing my slumbers, was also at Bendix and kept his feet on the desk next to mine. His specialty was, at that time, altitude control. I hope he has acquired some by now. Within a year that strange manipulator of peoples' destinies — called Fate by those to whom the mystic appeals — completed the disintegration of what was once an aeronautical engineer. Lo and behold, the final result, a traveling salesman! As Dan Sayre '23 used to say, he started at the top and worked down. He went from professor to pilot to ground-school instructor to editor. What a descent! I did not start so high but believe that in an esthetic sense, at any rate, I have done a better job of working down. The main consolation is that the monetary status has been inversely proportional to the professional.

1929 Continued

In this case Fate decreed that a good friend of mine was doing the advertising for a manufacturing concern in South Bend. It also worked out that this company was looking for a salesman. Some dignify the job by the title of factory representative, but the fact remains that it does no good to represent unless you sell. The setup was a natural from every angle, with an elegant future, we hope!

"The company, although 40 years old, has purposely been kept small and exceedingly healthy. There are only three of us on the road, and among us we cover every state. My regular territory includes Missouri, Kansas, Oklahoma, Arkansas, Louisiana, Texas, New Mexico, and California. We manufacture repair equipment for pipe (pipe clamps, to the trade), and our best customers are gas, water, and oil companies. I spend weeks at a time out in the oil fields of the Panhandle, down on the Gulf Coast, and in East Texas. Once or twice a year I spend two months in California. The reason I am bringing this up and one of the main reasons I ever started this letter (you are certainly wondering why by this time) is in the hope that some of you who live in this territory of mine will let me know where you are, and when I come down your way, we may be able to get together for an evening and swap yarns. I have spent a couple of week-ends with Bill Aldrich in Wyoming, have played squash with John McCaskey in St. Joseph, Mo., run into Hardwick on the streets of El Paso, and had lunch with Johnny Hanley in the wilds of the Panhandle at Pampa, Texas. I feel like an unofficial traveling secretary keeping track of the boys as I make the rounds, and if you'll drop me a card care of M. B. Skinner Company in South Bend, I'll put you in my address book. I guarantee not to stick you for a meal, night's lodging, or even a small loan. . . . I travel by car entirely (as long as bearings hold up), so no hamlet in the Ozarks or border town in the Rio Grande Valley is safe from the pipe-clamp peddler. . . ."

This is a grand letter, Wally, and you bet we will see you in June. If the boys see this Odyssey, they should loosen up with efforts of their own. Many thanks, Wally.

TENTH COMING UP! *Hold everything for June 2, 3, and 4!* Organize your local gang and get set for a colossal week-end at Ye Castle Inn, Saybrook, Conn. The committee will welcome any suggestions that you may have. For the present we have assumed it to be a stag affair. Let's have your reactions and ideas. Golf, tennis, and swimming are available, also deep-sea fishing if you wish. Drop a line to C. Brigham Allen, Jr., President, 277 North Avenue, New Rochelle, N.Y., or Fisher Hills, chairman, 37 Winthrop Road, Brookline, Mass. — **EARL W. GLEN**, *General Secretary*, Box 178, Fairlawn, Ohio.

1931

Jim Fisk has kindly forwarded a letter from Willis Fleisher and also included a few brief words about his own recent

activities. Jim writes from the University of North Carolina: "I am now associate professor of physics here (teaching graduate courses and building equipment for research in nuclear physics), having resigned from the Society of Fellows at Harvard in September. Spent the summer in the Kaiser-Wilhelm Institut für Medizinische Forschung in Heidelberg, working under Bothe in nuclear physics. Married to Cynthia Hoar of Concord, Mass., June 10. Joe Birdsall and his wife are collecting anthropological data among the natives in the Australian bush, sent out from Harvard."

In a letter dated January 15, Willis Fleisher writes as follows: "It seems that any news I may gather comes annually; One year ago tomorrow I announced the birth of my son John. Tomorrow I'm starting a new job. I have left the H-B Instrument Company — after four and a half years — to take a job as factory manager for the French-Wolf Paint Products Corporation, with factory at Bristol and office in Philadelphia. I'll be at the factory, of course. I'll have a real job learning the paint business in no time, as the sales manager has been holding down the job since the death of the last factory manager. At a discussion group meeting last week we were addressed by one Chik Ho Lam, graduate student at the University of Pennsylvania and nephew of the Chinese member of our Class who bears the same name. Besides speaking very clearly of the Sino-Japanese situation and answering a barrage of questions, he told me that the Chik Ho Lam we knew is now in Switzerland with his wife and child recuperating from some kind of heart attack."

"Saw Bob Leadbetter at a Technology Club meeting and again at Pitcairn Field, where he is handling Cub airplanes as a side line to his Surpass Leather job. If any of the Class happen to be in the vicinity of Bristol or Elkins Park, where I'm still living, I'd be glad to see them again." — Many thanks to both Jim and Willis for their letters and best of luck in their new work.

A newspaper clipping from the *Bombay Chronicle* gives a brief sketch of the career of Anant H. Pandya: "Dr. Anant H. Pandya had a brilliant career at the University of Bombay, having stood first class first at each one of the three engineering examinations of the University. He had, in addition, secured several scholarships and prizes, including the James Berkeley gold medal in 1930. He continued his engineering studies in America at the Massachusetts Institute of Technology and secured the Austin Research Fellowship in 1932-33. He was appointed the same year as the honorary fellow of the Institute as a special mark of distinction. Dr. Pandya received the degree of Doctor of Science in 1933 and is now Chief Engineer of a British firm in London."

The marriage and engagement news is limited this month: Mr. and Mrs. Arthur Fremont Steeves announce the marriage of their daughter, Miss Shirley Louise, to Joseph Bernard Shea on Friday, January

27, in New Haven, Conn. — **BENJAMIN W. STEVERMAN**, *General Secretary*, 11 Glenland Road, Chestnut Hill, Mass.

1933

The Secretary had a note from Ed Goodridge the other day in which he tells of bending elbows with Jim Merrill and Al Payne during February. Jim is married to a lovely girl, a librarian at Columbia University. Al Payne, who was married about a year ago, is living in Westerly, R.I., where he is helping design printing machines. Ed Goodridge is still a bachelor, and recently moved into a new apartment, 51 Fifth Avenue, New York City. He extends an invitation to anyone coming to the World's Fair this year. Ed says that he can accommodate one or two men with sleeping quarters and whatever they find in the refrigerator. We all have heard about Ed's up-and-coming business, and he now tells me that he is operating three offices — New York City, Philadelphia, and Baltimore — and is looking over the prospects of opening an office in Boston. In addition to its present business of sign control and timing equipment, Goodridge's company is working on some new products which they hope to get out within three months.

In a letter accompanying a contribution to the Alumni Fund, Gardner Harvey wrote a bit of his history: For the past three years he has been in advertising work with the Eagle-Picher Sales Company "a far cry, it might seem, from slide rules and test tubes, but you'd be surprised how the old Tech dope fits into industrial advertising." At the time of his letter, written at the beginning of the year, he was making a transfer to the Atlas Powder Company, Wilmington, Del., to continue the same type of work. "Things are just beginning to look bright for yours truly, and many's the time I've thanked my lucky stars for the years spent at dear old Alma Mammy."

We are also happy to announce the marriage of Nat Goodman to Miss Tillie Hershman last November. Nat's new address is 1252 Derry Street, Harrisburg, Pa. We also have announcements of the arrival of Peter Clark Robinson at the home of Mr. and Mrs. Richard Robinson on November 16, and of the arrival of William Newell Smith at the home of Mr. and Mrs. Bob Smith on February 9. This is the second addition to the Smith family; they have a little girl four years old. Congratulations to you all. — **GEORGE HENNING, JR.**, *General Secretary*, Belmont Smelting and Refining Works, Inc., 330 Belmont Avenue, Brooklyn, N.Y. **ROBERT M. KIMBALL**, *Assistant Secretary*, Room 3-102, M.I.T., Cambridge, Mass.

1934

From several parts of the globe news reaches us this month of Technology men in action. From war-torn Spain the report comes that Robert F. Allen was one of 23 American refugees who escaped shortly before the arrival of the insurgent troops. Bob has been in Spain since March of 1937 when he joined the International Brigade to serve with the Loyalist forces. He has

You will find on page 1 information on Alumni Day, June 5

1934 Continued

subsequently seen service as an ambulance driver, surgical assistant, editor of the *Loyalist Bulletin*, and as a member of the staff of the Loyalist propaganda bureau. A few months ago Bob married a British girl in Barcelona. With the downfall of that city, Bob and his wife escaped to Marseilles, France, along with a group of American refugees. We hope Bob will give us a detailed account of some of his adventures, as they should prove very interesting to the whole Class.

Word has been received from the Navy Department, Washington, D.C., that naval aviation cadet, George M. Cunha, who is now living in San Diego, Calif., has successfully completed the naval aviators' course at Pensacola, Fla., and has been ordered to duty with Scouting Squadron 71 aboard the aircraft carrier U.S.S. *Wasp*. After George got through school, he began his naval aviation career at the United States Naval Reserve aviation base in Squantum, Mass.

Bob Metcalf has been seeing stars lately due to the hobby at which he works in the garage of his home. He has built himself a six-inch telescope, grinding the mirror out of Pyrex glass. We are told the instrument is the envy of every amateur astrologer in the vicinity. He has made satisfactory observations of Jupiter, showing the four satellites of that planet which are visible to telescopes of moderate size, and of Saturn and its rings and numerous fixed stars. — Ed Bromley has had recently another addition to his family and again it is a boy — James Hancock. We hope this latest addition isn't going to put Ed, Jr.'s, nose out of joint. Ed, Sr., is now in charge of the lace curtain division of the Quaker Lace mill in Philadelphia.

In our social column we have a number of high lights to mention: Samuel Cabot, Jr., who became associated with our Class after graduating from Harvard, is engaged to Miss Virginia Ward, daughter of Mr. and Mrs. Hugh C. Ward of Beverly Farms, Mass. Sam is working with his father's firm, Samuel Cabot, Inc. — Eugene Connelly was married in January to Miss Dorothy Louise Leddy, daughter of Mr. and Mrs. John Leddy of Elmhurst, Queens, N.Y. The ceremony took place in St. Bartholomew's Church in Elmhurst. After a wedding trip in the South, the couple will live in Elmhurst. — A clipping from the VI-A *News* announces that "once again that cheerful little cherub, one Dan Cupid by name, has scored a hit in our VI-A group. Clark Nichols . . . is the latest to fall victim to his bow. Clark took as his bride Miss Eleanor Brooks of DeLand, Florida. The wedding took place on New Year's Eve at the Hotel College Arms in DeLand." — Another one of cupid's conquests is that of Bernard Goldford and Frema Leona Meltzer, who were married at the Temple Israel. The couple will make their home in Portsmouth, N.H. Bernard is employed as electrical engineer for the Navy Department.

Notice was recently received of the marriage of Herbert W. Andrews to Miss Blanche Hungerford Johnston on Janu-

ary 26 in the Presbyterian Church, Westfield, N.J. Mr. and Mrs. Andrews plan to live in Plainfield, N.J. Best of luck, Herb! — Mr. and Mrs. L. Cohen have announced the engagement of their daughter, Ruth Stella, to Raymond S. Levine. Raymond is at present a junior executive in Sears, Roebuck and Company in Boston. — Tom Donlan is engaged to Miss Elizabeth M. Du Wors, daughter of Mrs. Martin Du Wors of Dorchester, Mass. Miss Du Wors was graduated from the Boston City Hospital school of physiotherapy. — Bob Grosjean has got himself involved in what appears to be an international romance. He is engaged to Emlen Knight Davies, daughter of Mrs. Emlen Davies of Washington, D.C. Miss Davies' father was the former United States ambassador to Russia and is now ambassador to Belgium. Bob hails from Brussels, Belgium, and is now connected with the London offices of General Foods, Inc. The wedding will take place in the spring.

When are you fellows going to break loose and start writing lucidly and copiously of what you are doing? — JOHN G. CALLAN, JR., *General Secretary*, 184 Ames Street, Sharon, Mass. ROBERT C. BECKER, *Assistant Secretary*, South American Development Company, Apartado 655, Guayaquil, Ecuador, S.A.

1935

From newspaper clippings and three letters we glean a bit of news this month. Probably the most interesting item is a bit old (December 21) but has not come to the attention of this column until now. Our own John Duff, 3d, was elected councilman-at-large of the city of New Bedford, Mass., by a record-breaking vote. Johnny acquired 400 votes more than did the mayor and exceeded the previous record total given to President Roosevelt from that city. Such popularity must be deserved. Looks as though you fellows slipped up when you voted Ned Collins and your Class Secretary as the class politicians.

We have the usual number of marriages and engagements to report. A wedding announcement new to this column is that of Theo G. Morss on June 3, 1937. Theo was with us the first two years at school. John Tebbetts, Jr., and Lucille Scudder have announced their engagement. John has been with the Travelers Insurance in Hartford since graduation. Oliver Hoag and Lucille Gulliver of Needham, Mass., have announced their engagement.

An extract from *Aeroplane* magazine informs us that Harry Gallay has been appointed assistant aeronautical engineer at the headquarters of the Royal Canadian Air Force, Ottawa. Harry has been in England for several years and has returned to Canada. A design for a light airplane submitted by Harry and Mr. Bufton, a fellow engineer in England, tied for first place in the design competition organized by the Chelsea College of Aeronautical Engineering. The item also reports: "In 1937 Mr. Gallay delivered an excellent lecture on 'Air Transport in Canada'

before the Graduates and Students Section of the Royal Aeronautical Society." Harry certainly is on his way to becoming a top-flight aeronautical engineer.

Faithful Charles Smith sent in another letter. He reports that Reid Ewing (also in Buffalo) has been doing a good deal of commuting to Cleveland in connection with the installation of some of the Linde Company's equipment. Jack Ryan and Jack Rumsey '33 organized an alumni meeting in Buffalo for January 30. Smitty wrote before the meeting took place, however, so there is no news of the meeting to report. Smitty reports that Mike Kelakos has been very active in the western New York section of the American Chemical Society and has had his picture in their publication. Smitty's last item calls attention to an old event, but one that has not appeared in this column before. A patent was granted to Professor Thomas K. Sherwood '24 and to Lou Garono covering a method of drying leather. The patent is an outgrowth of the undergraduate thesis work Lou did in 1935. Bill Root, in a short note, reported that Cason Rucker is still with Sears, Roebuck and has been transferred to their Chicago office.

Jeff Farmer wrote a short time ago. (Reason for writing: I omitted to send him a copy of the survey. Funny how many of you fellows wait until you have a complaint to make before you get around to writing.) Jeff says that he sees quite a bit of Larry Sharpe '36. Larry bought a sailing skiff last spring in which he and Jeff explored the greater part of Greenwich Bay, to the disgust of their wives. "When the smoke of the hurricane cleared away," Jeff writes, "there was Larry's skimming dish standing upright on the side of a hill near the bay, with a huge tree down on each side of it, unharmed amongst the wreckage of most of the boats of the bay. You see, Larry used a horse weight for an anchor, so she took off up the bank with the first puff." Jeff asked me to send out a call to all the Betas for news, so come on you Betas, let's see some news. — ROBERT J. GRANBERG, *General Secretary*, Central Y.M.C.A., 100 Gibbs Street, Rochester, N.Y. RICHARD LAWRENCE, *Assistant Secretary*, 111 Waban Hill Road North, Chestnut Hill, Mass.

1936

Our letter of the month — the only letter — is from Art Wells, who arrived back from his trip to Africa the latter part of December. He writes about the members of Course XIII: "In checking over this year's Reviews I find that I did not write of the marriage of Miss Ruby White to Alan Hardman at Mount Vernon, N.Y., on June 25. Al is in the operating department of the Moore and McCormack lines in Jersey City, N.J.

"In September I wrote that Frank Mather was going to take his 32-foot auxiliary yawl, *Sparrowhawk*, on a short cruise to Maine. Although I haven't seen Frank since returning from my trip, I understand that he returned somewhat sooner than he had expected and was sail-

1936 Continued

ing in the Sound at the time of the September hurricane. Frank tried to keep out of trouble with the help of his motor, but the wind finally won and landed Frank and his yacht on solid ground, well above the high-water line. Luckily, Frank came away from the wreck in good health. Back in his apartment in New York City, he nonchalantly remarked to his friends: 'It was a good sailing breeze up to about 60 miles an hour, but then my sails blew out.' Frank, who was in the drafting room at the Bethlehem Steel 56th Street plant in Brooklyn, has recently joined the organization of John G. Alden, naval architects and yacht brokers, in Boston.

— Harrison Woodman returned in December from a short trip to Europe and is now working in New York City, having entered the marine department of C. D. Mallory and Company, Inc., which operates a large fleet of vessels in coastwise service. Woodie is living at 30 Daniel Low Terrace, St. George, Staten Island.

— Art Mayo, formerly with Lucian Q. Moffitt, Inc., is now at the Bethlehem Steel Company's Fore River shipbuilding plant.

"Thanks to Charlie Miller for sending in the course news while I was away. Since I haven't as yet gathered much in the way of news, I'll say a little about the African trip. The *Robin Adair* left New York and headed for Africa on September 15. After three weeks of steady running, we were rewarded with a glimpse of rugged, high-cliffed St. Helena, the little island about a thousand miles off the coast of Africa where Napoleon spent the last six years of his life in exile. Another week gave us our first glimpse of Africa, and after watching the imposing table mountain behind Cape Town increase in height hour by hour, we finally came to anchor behind the Cape Town breakwater. We found a large, modern city of about 335,000 people, half of whom are of European descent. One cannot help being impressed by the modern harbor facilities in this and other South African ports. At Cape Town the shipping is accommodated in two artificial basins. The ships tie up along the cement jetties which form the basins, and the cargo is handled by powerful electric level-luffing cranes, which move under their own power on tracks at the edge of the jetties. On the apron are three rows of railroad tracks, behind which is a transit shed with one platform on a level with the freight cars and another on the second story. Often two cranes are used to load or unload one hatch. With this equipment and ample labor in the form of colored (half-bred) longshoremen, the cargo handling is fast and efficient. In the event that the Suez Canal was blockaded or otherwise made unavailable to shipping, the importance of Cape Town as a port would be greatly increased. With this in mind, ambitious plans are now under way for augmenting the present facilities, including doubling the present number of berths and building a large graving dock.

"After leaving Cape Town, we rounded the Cape of Good Hope and called at Port Elizabeth and East London, where we found the same excellent accommoda-

tions for shipping. One side of the basin at Port Elizabeth is devoted to the handling of increasing movements of fruit to Europe, and the jetty was equipped with a large refrigerated storage shed. Our next stop was at Durban, a large modern city of about 240,000 people, of which about a third are European. The harbor, which has been built within a natural landlocked bay, is a splendid example of intelligent planning. One side of the harbor has been made into a mile-long quay, equipped with transit sheds and served by three rows of railroad tracks, 50 three- and four-ton level-luffing electric cranes, and one 80-ton crane. A 42,000-ton grain elevator is located on the quay at one end of the harbor for handling export grain movement. At this end of the harbor is a 1,150-foot graving dock. At the other end of the harbor are quays for oil and coal bunkering. In the city of Durban one finds modern hotels, stores, theaters. Many South Africans come to Durban for their summer vacations (December and January), and the marine parade on one side of the city reminds one of Atlantic City. All the harbor and railroad facilities in South Africa are owned by the government, and throughout there is a standardization of equipment, systems, and fees.

"After leaving Durban we followed along the even coast up to Lourenço Marques in Mozambique. Although this is Portuguese country, the hinterland served by this port includes a large area of the South African Transvaal territory. Here again we found modern quays, served by railroads and cranes, government owned. Our next port, Beira, also in Mozambique, serves chiefly as a terminal for the export of iron ore and copper ore. Not under government ownership, this port is not so well equipped as the others that have been mentioned, and much of the loading has to be carried out with ship's gear, from lighters. The next call was at Tanga, in the Tanganyika Territory of British East Africa. The principal excuse for Tanga's existence is the export movement of sisal, which is brought to the coast by railroad. Although there are crane-equipped piers here, they are available only to small craft, and ocean vessels must be loaded from lighters. We next called at Mombasa, in the British Kenya Territory, and here we found the modern terminal equipment that made us admire the South African ports. The contrast of old and new makes this city very interesting. Part of the city, inhabited by the natives, has changed very little in the last 400 years. White people very seldom penetrate this part of the city. When I wandered into this district one day, I found that at each turn of the street there was a child stationed to give a warning signal to those in the next alley. However, in the new section of the city, one finds broad paved streets, fine hotels, stores, and theaters.

"Leaving Mombasa, we headed south and called at many of the same ports. We stopped again at Tanga, where we received sisal, and then called at Kilwa Kisiwani, where we saw the really primitive undeveloped Africa. Ours was

the first ocean steamer that had visited there for a month, and immediately upon anchoring we were surrounded by the entire harbor fleet of dugout canoes and crudely built, lateen-rigged dhows, from which we received a few tons of mangrove bark. The population of this village consists of about 60 natives of the Swahili tribe, who live in mud-walled, grass-covered huts. After an amusing trip to shore, partly in a dugout canoe and partly on the shoulders of a husky black, I had a chance to browse around among the ruins of a large city built by the Persians before 1000 A.D. The state of preservation of these buildings gave cause for thought. In many places the cement, holding together the coral blocks, was still intact. Over one of the doors the colors in a carved design were still distinguishable.

"On the run back to Cape Town we also stopped at Dar es Salaam, Lindi, and Mikindani, all in the Tanganyika Territory. We called again at Beira, Durban, and Port Elizabeth, and on November 25 arrived again at Cape Town. Sailing the same day, we headed north and west for Trinidad, a three weeks' run. After fueling at Trinidad we headed north through the Virgin Islands and back to New York, arriving there the day before Christmas. I had a passenger stateroom during most of the trip but was signed on as member of the crew and stood watches in the engine room. At the end of the trip I returned to the marine department of the Seas Shipping Company." — You had quite a trip, Art, and we're interested to hear of your experiences and observations of South African port facilities.

Most important of the news that has come to hand during the month is the word that Ray Woodrow, VI-A, is the proud father of a boy born on January 15. Ray is connected with the Philadelphia Electric Company. — There are also several engagements that have been announced recently. Miss Carey Bell Bowen of Ridgewood, N.J., is engaged to Lyman Hill, IX-B. Miss Bell is a graduate of Duke University. Miss Dorothy K. Lennon's betrothal to Peter White, VI-A, has been announced. Pete's fiancée was graduated from Boston Teachers College in 1937. Doug Cairns, XV, will take as his bride Miss Kathleen Keville of Belmont, Mass. Randal Robertson, who received his Ph.D. in physics with our Class, will marry Miss Florence Dunbar, Mount Holyoke and Columbia University graduate and now a student at Yale. After leaving the Institute, Robertson was a research assistant in the physics department at Columbia University for a year and is now in the research laboratories of the Norton Company at Worcester, Mass.

I was in Toronto recently to see a hockey game between the Bruins and the Maple Leafs, and right behind me at the game was Jean Leman, IX-B. He is working for the Sun Oil Company on a job which combines sales and operations. After leaving school he traveled in Europe awhile for a banking firm, and then started with the Sun Oil Company in a training course in Montreal. He was

You will find on page 1 information on Alumni Day, June 5

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transferred to Toronto about a year ago. — Ralph Van Sant, XV, is with the Gulf Refining Company in Toledo, Ohio. — Joining Dorian Shainin at Hamilton Standard Propellers in East Hartford, Conn., is Boris Maximoff, VI-A. — Walt MacAdam, also VI-A, is now with the American Telephone and Telegraph Company in Savannah, Ga. — Joe Kingsbury, VI, has also joined the A.T. and T., but is in Salt Lake City. — Charlie Graves, XV, is with the Forbes Varnish Company in Cleveland, Ohio. — An addition to the contingent from our Class at the Newport News Shipbuilding and Dry Dock Company is Marshall Christensen, IV. — Harold Brown, XIV, is back at the American Steel and Wire Company research lab in Worcester, Mass., after having worked for a while in Kearny, N.J. — Two more of our Class have joined the M.I.T. contingent working at the laboratory of the Linde Air Products Company here in Buffalo. Jim Craig, II, has been transferred here from the Newark laboratory and is living at 32 Chapel Road, Kenmore, N.Y. The second addition is Jack Hamilton, XIV, who has been transferred from the Union Carbide and Carbon laboratories in Niagara Falls. Jack is still living in Niagara Falls, at 5815 Buffalo Avenue. Add these to Jim Patterson, II, Shorty Hubbard, IX-B, and your Secretary, Tony Hittl, I, and I believe we have here the largest concentration of members of the Class. A couple of other recent additions to our laboratory also "know everything" by virtue of having been to M.I.T. They are Ken Moslander '33, XV, and George Patch '34, I, who were transferred from Newark. These report that they have seen our prexy, Johnny Austin, who is connected with the parent Union Carbide and Carbon Corporation in publicity work. — ANTON E. HITTL, *General Secretary*, 491 Ashland Avenue, Buffalo, N.Y. ALLEN W. HORTON, JR., *Assistant Secretary*, Room 3-208, M.I.T., Cambridge, Mass.

1937

Dick Karch appears to be very happy at his work with the Gulf Oil Corporation at West Port Arthur, Texas, in spite of

what he claims is a forsaken place too far away for anyone to write. Last June he sent me an announcement of his wedding, so by this time he is an experienced and well-seasoned benedict. How about that, Dick? Andover, Mass., was Dick's home town, so it isn't surprising that his bride came from there too. She is the former Miss Beatrice Lyman and, unless I miss my guess, she is just about now getting used to being called Mrs. Richard Karch. Dick is now a welding supervisor. He relates: "... We have to weld on pipe, dealing with pressures of 3,000 or 4,000 pounds per square inch. Also have a lot of boat work, as we maintain our own tankers. Keeps us busy, as we are paid by the month and are paid while we sleep, which means as little sleep as possible. For example, last Sunday they called me ... at eight o'clock, and I got home next morning at six.

"While I think of it," he goes on, "I will pass on what news I know. Bob Wylie was married last October in New York; he and his bride are living in Brooklyn. Johnny Gallagher was also married last fall and is working in Pennsylvania for some zinc company." That reminds me, Dick; I must shoot some arrows myself: Dwight Wrigley, Wayne Pierce, 2d, and Ralph P. Webster all decided that living alone was not to their liking. The details of Dwight's wedding are lacking, but Ralph was bolstered at the altar of the Hancock Congregational Church in Lexington, Mass., by his brother, Brooks, as his beautiful bride, Miss Florence Caswell, came down the aisle. Are you used to being called "Mrs." yet, Florence? — Harry Kohl was Wayne's mainstay in the trying moments just before the latter's wedding ceremony which took place in the West Concord, Mass., Union Church. Miss Grace Miller is now Mrs. Pierce, and the two are living at 54 Chestnut Street, Manchester, Conn. — Out in Chicago, which is no longer far, far away since the air line makes it about four hours from the East Coast, Jim Freiberg has taken that first step: Early in January, Miss Dorothy Stein and he announced their intentions. As far as I know, no date has been set.

Dave McLellan quotes from a letter from Ed Mosehauer, who in turn writes from 85 Penn Drive, West Hartford, Conn. I won't bother to go into the quotes quotes for fear of quoting in duplicate or triplicate or becoming even more involved than now. Ed speaking: "My junior-year roommate, Al Hale, is doing fine as a more or less dignified poppa of an eight months' old baby, which, as you might have guessed, is the most beautiful, intelligent, healthy, precocious, and generally remarkable baby that was ever born — end quote. (See!) In addition to that, the baby is also a budding pugilist (and so young too!). Alfred is gracefully assuming his role as a family man by becoming very bald. (Absolutely no sign, Ed; if you will remember, Bob Harris and I were that way in school.) Of the boys who started life in Manchester, as I probably told you before, two are married and trying to lead well-ordered, dignified existences. I refer to Wayne Pierce and Dwight Wrigley. ... The sole remaining bachelor of the Manchester group is Charlie Dodge. ... Dave Hill left these parts some time ago and is wintering in California, where he is giving his services to the Lockheed Aircraft Corporation." — Bob Fischel, who came East for the holidays, is also with Lockheed and doing quite well. — A final bit has come in about Donald Duncan's being on the staff of Pratt Institute as an instructor in mathematics. Would be interested to learn more. — WINTHROP A. JOHNS, *General Secretary*, 245 Hale Street, New Brunswick, N.J.

1938

Your Secretaries are sorry to report that no news of classmates has come their way this month. If you want some news, and we are sure you do, send us some items. We would especially like to hear from, or about, the members of the Class who left us before June. Let's put the postman to work on Bergy's route. — DALE F. MORGAN, *General Secretary*, Graduate House, M.I.T., Cambridge, Mass. LLOYD BERGESON, *Assistant Secretary*, 885 Beacon Street, Newton Centre, Mass.

WATERWAY ENGINEERING BY DR. OTTO FRANZIUS

(TRANSLATED BY DR. LORENZ G. STRAUB)

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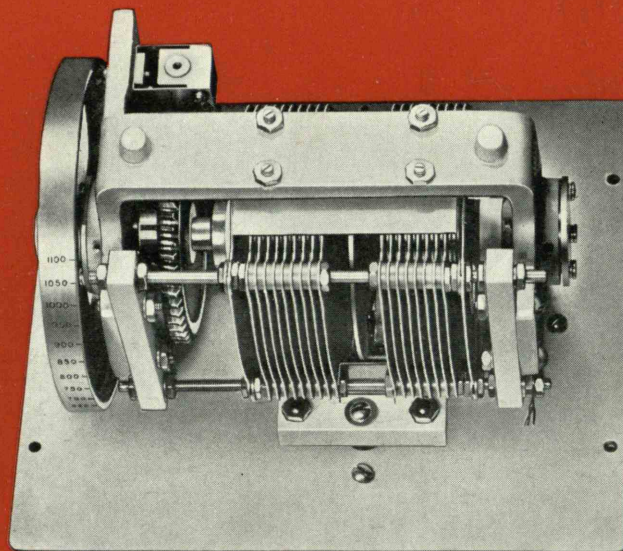
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The Type 493 Vacuum Thermocouples are heater-type couples designed for accurate measurements of r.m.s. values of voltage and current irrespective of waveform. These units can be used with good accuracy for current measurements to frequencies up to about 300 Mc. Many new and unique features are incorporated in these couples. Four unmounted models (preferred for ultra-high-frequency use) with rated currents from 3 ma to 100 ma and with corresponding heater resistances from 600 ohms to 2 ohms, are priced at \$10.00 each. The corresponding mounted models are priced at \$12.50 each.

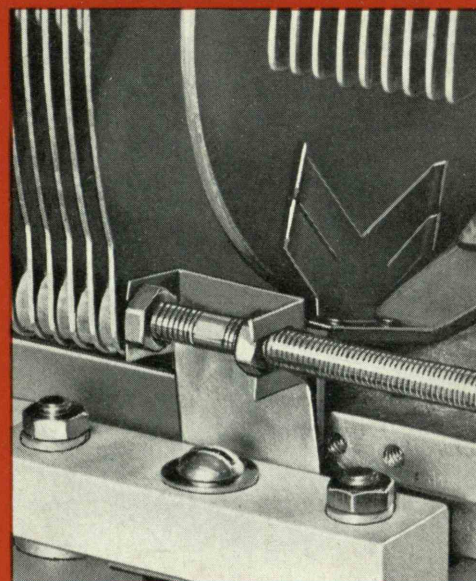
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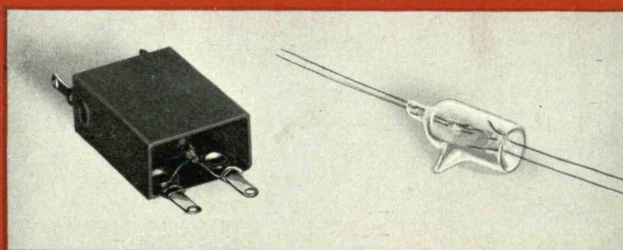
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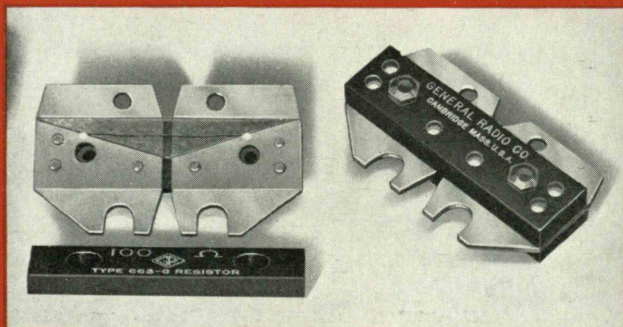
Standard Type 722 Precision Condenser mechanical construction



In the 722-N Condenser, connections to both plate stacks are made at the center



Type 493 Vacuum Thermocouples in unmounted shipping case (at left). Heater and couple leads brought out at opposite ends of bulb



In the Type 663 Resistors the wire is clamped on flat metal fins to decrease inductance and increase power dissipation



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